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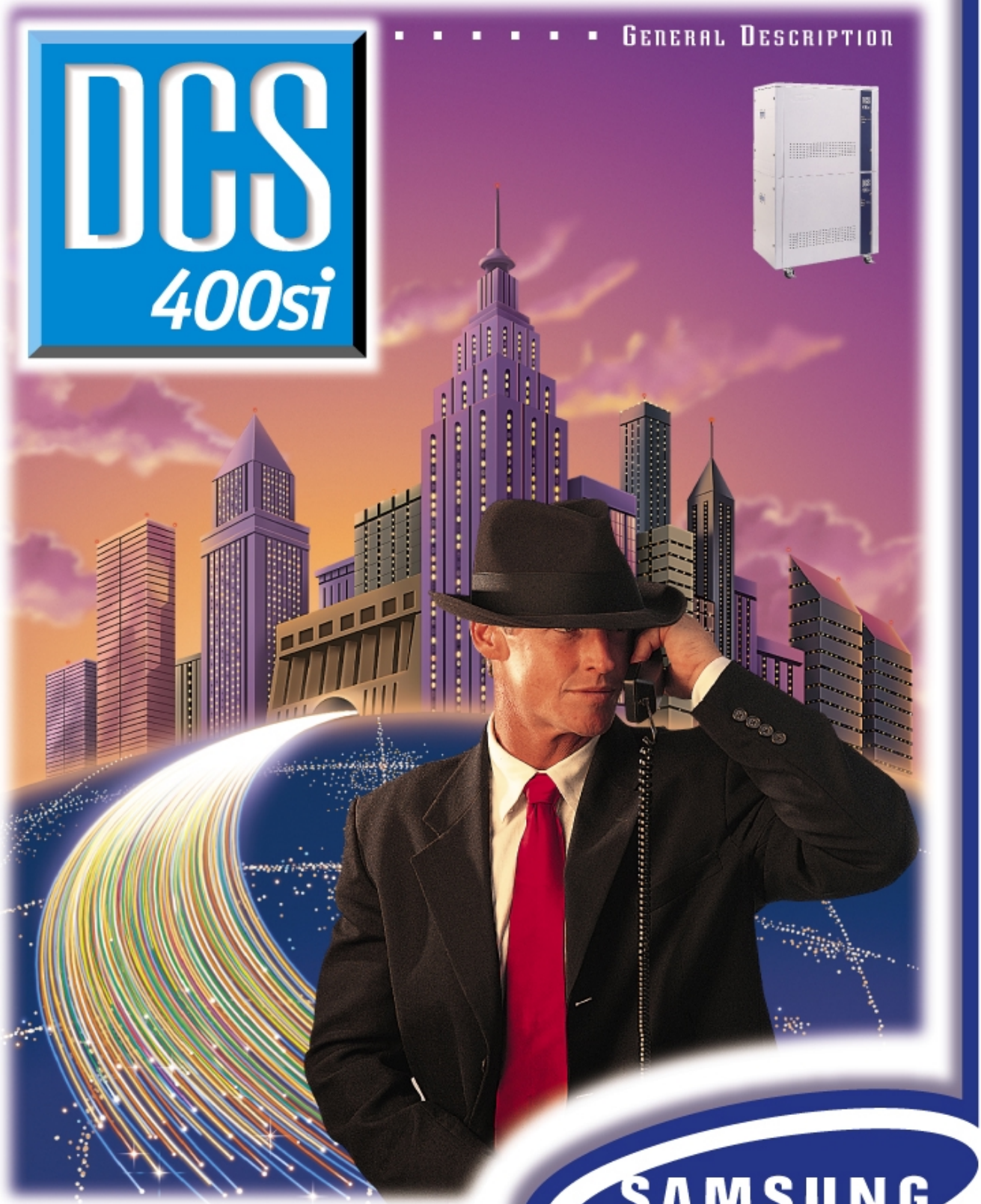
DCS 400si

General Description



SAMSUNG

Wait Till You Hear What We See

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Digital Communications System

General Description

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telecommunications

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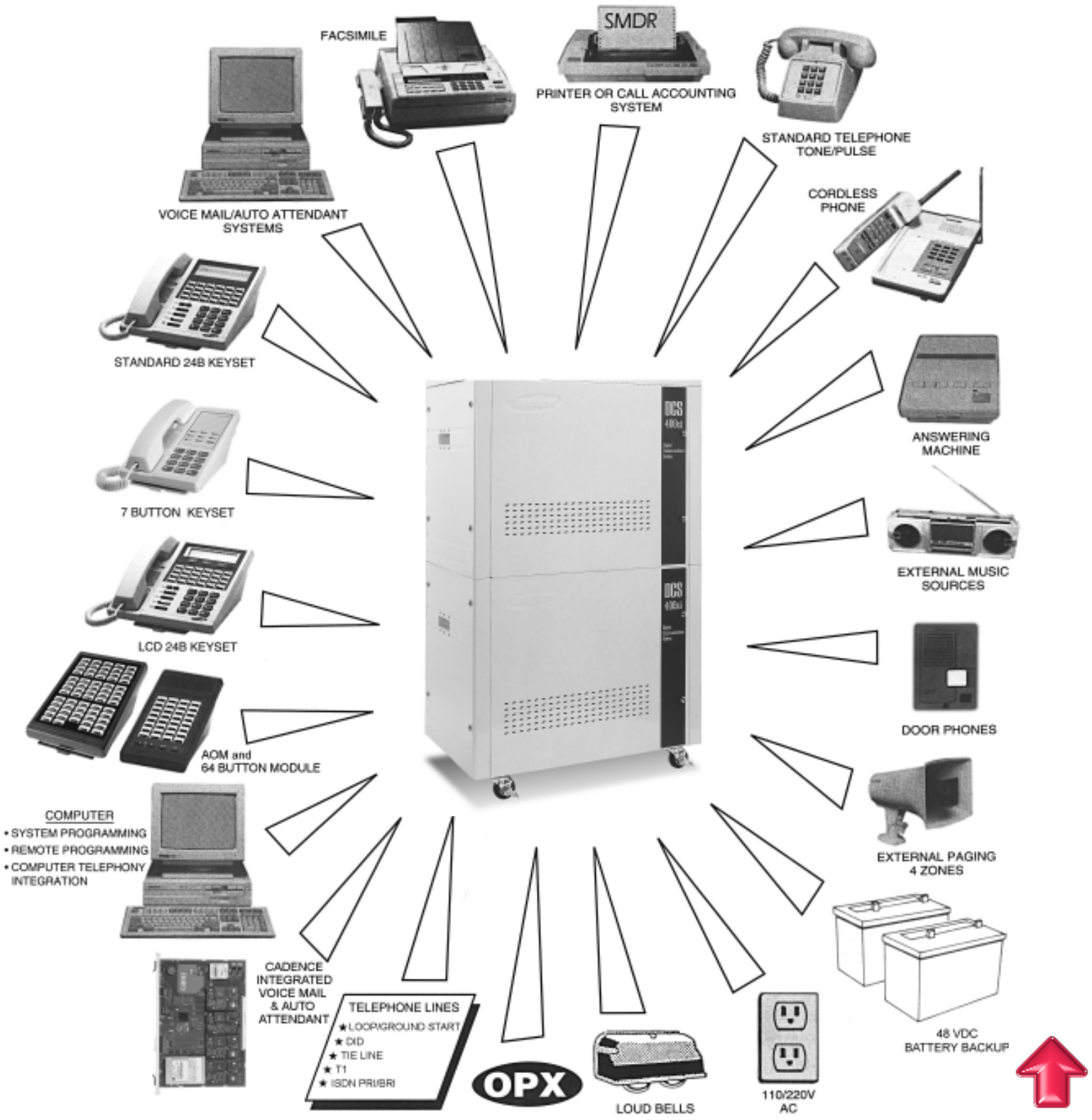

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PART 1. SYSTEM OVERVIEW

1.1 GENERAL DESCRIPTION

The DCS (Digital Communications System) 400si is a digital telephone system designed for small to medium-sized businesses. It can operate with the functionality of a square key system, PABX or a combination of both (hybrid). The DCS 400si employs the very latest DSP (Digital Signal Processor) technology and utilizes dynamically allocated time slots providing 384 usable ports.

The DCS 400si offers a variety of interface cards that allow connection to the public telephone network or to private networks. These are generally referred to as trunk cards. Two types of telephones can be connected to the system. Proprietary digital phones called “keysets” connect to digital line interface cards (DLI). Standard telephones generally called “single line sets” connect to single line interface cards (SLI). In addition, DLI station ports are used to connect peripheral devices such as door phones, serial interface devices and add-on modules and CTM modules. Miscellaneous circuits are provided to allow such optional features as external paging, music on hold, background music, common audible devices, alarms and emergency power failure telephones. Most interface cards can be inserted or removed with power on to eliminate unnecessary service interruptions while performing maintenance.

All DCS 400si keysets utilize a single PCB with surface-mounted components assuring the highest product quality and long life. Samsung’s customary large, easy-to-read displays and LEDs design make them much easier to use. In many instances, sophisticated features are made simple through the use of friendly display prompts or push-on/push-off feature keys.

Expanding the 400si system is both economical and easy. Stack the expansion cabinet on top of the main cabinet to double the size of the system. A Removable Customer Module (DCDM) and a Removable ROM Module make it convenient to upgrade to future feature packages.

1.2 SIZE AND CONFIGURATION

The DCS 400si is a fully modular system comprised of a main cabinet and one additional expansion cabinet, interface cards and electronic keysets. Each cabinet has 10 universal card slots providing 192 ports. A fully expanded system has 384 universal ports capable of supporting various combinations of stations and trunks. The DCS 400si cabinets are identical in construction and have a passive backplane with all active circuitry located on the plug-in circuit boards. This means that any enhancements to the system are done on the cards and do not require replacement of the cabinet(s).

DCS 400si System Maximum Capacities

CONTENTS

	Total Ports	Keysets and 32B AOM	64 Button Module	SLT	Analog Trunks	T1/PRI Digital Trunks	BRI Digital Stations Trunks	Power Failure Transfer
Main Cabinet	192	192	32	192	160	6 (144)	10	16
Expansion Cabinet	192	192	32	192	160	6 (144)	10	16
Total	384	384	MAX. 32	384	320	12 (288)	20	32

SINGLE CABINET SYSTEM

192 ports (Figure 1–1)

- Stylish metal cabinet
- Wall mounted or free standing
- Common Contral Processor slot
- 10 Universal Card slots
- 2 Power Supply slots
- Power distribution board
- AC & DC power cables
- Top, front and side covers
- 16 Circuit Power Failure Transfer board (optional)
- Ring Generator and Message Waiting Lamp Supply (optional)

FIGURE 1–1

TWO CABINET SYSTEM

384 ports (Figure 1–2)

- 2 stackable metal cabinets
- Free standing (castors/legs)
- Common Control Processor slot
- Expansion Control Processor slot
- 20 Universal Card slots
- 4 Power Supply slots
- Power distribution board
- AC & DC power cables
- Top, front and side covers
- 2–16 Circuit Power Failure Transfer board (optional)
- Ring Generator and Message Waiting Lamp Supply (optional)

FIGURE 1–2

CONTENTS

1.3 TECHNOLOGY

SWITCHING

System switching is accomplished by means of a custom IC “engine” that provides 256 switchable digital channels. When expanded to a two cabinet system the matrix is expanded to 512 digital channels. The engine is controlled by its own 16 bit Motorola MC 68302 microprocessor and switching control program. The 68302 microprocessor is specifically designed for communication systems. Each of the 512 digital channels is automatically assigned to carry voice or data as required by system operation in a PCM format.

In addition, the system also utilizes Digital Signal Processors (DSPs). Each DSP may be configured by the switching control program as a DTMF receiver or as a C.O. tone detector on a per-call basis. Each engine chip contains four DSP channels. One engine chip is located on the central processor card. Additional DSP’s can be easily added using plug-on daughterboards. This means that a system can contain a total of 68 DSP channels when fully expanded. These 68 DSP channels are fully shared throughout the system as a common resource. Additionally, 24 dedicated CID DSPs can be added to support the Caller ID feature. These 24 dedicated DSPs are fully shared throughout the system. Consult your Technical Manual–Installation Section for provisioning details.

MEMORY

The DCS 400si system is a Stored Program Control (SPC) multiprocessor system. The main system program and operating system (OS) are stored in four EPROM (Erasable Programmable Read Only Memory) chips totaling 2,048 kilobytes of memory. These four EPROMs plug into sockets on the DROMD daughterboard which plugs onto the DCCP (main processor) board. Please see section 2.6, DROMD Daughterboard, for more details.

The customer database and main processor scratch pad memory are contained in 2 Mbytes of SRAM (Static Random Access Memory) which is located on the main DCCP board. In case of a power outage the SRAM is protected by an onboard lithium battery for up to 2,000 hours.

An optional DCDM (DCS 400si Customer Data Module) daughterboard can be plugged onto the DCCP that provides an additional 2 Mbytes of “Super Capacitor” backed SRAM memory. This SRAM memory is an auxiliary customer database storage location that can be used to store a copy of the customer’s most recent system database. The super capacitor will maintain the DCDM memory up to 150 hours in case of a power outage. Please see section 2.6 for more detailed information on the DCDM.

MICROPROCESSORS

The DCS 400si uses distributed processing. Its primary (CCP) processor is a 16 bit Motorola MC68302 operating at a clock speed of 16 MHz. This processor provides local control of the 256 PCM channels in a single cabinet system. In an expanded system, an additional

CONTENTS

processor (ECP) is coupled with the primary processor expanding the system to 512 PCM channels. Secondary processors are located on station and trunk cards. The tertiary level of processing is done in the keysets. The digital keysets use a Hitachi H8 processor for data communication within the DCS 400si.

1.4 PROGRAMMING

The DCS 400si is a self-configuring system. This means that immediately after applying power, the DCS 400si reads the types and locations of all installed cards and telephones and assigns default data to them. This data provides for system operation minutes after applying power. All trunks and stations are assigned according to the default numbering plan. This numbering plan is flexible and may be changed to suit customer requirements. The installing technician customizes this default data to meet the end user's requirements.

The system can be programmed from any LCD display keyset without interrupting system operation. There are three levels of programming: TECHNICIAN, CUSTOMER AND STATION. The technician level has access to all programs and can allow the customer access to system programs as needed. Technician and customer access are controlled by different security passcodes and access procedures. Station programming allows the individual station user to set various options applicable to their station only. Keyset users have more options than single line users. Each station user has their own passcode. The Customer or Technician level programming can also be used to set individual station options.

The DCS 400si also provides for the use of a proprietary windows based computer program called PCMMC. This permits a technician to program the system using a personal computer. PCMMC can be used on-site to modify the customer database or to download (save) the entire customer database to a file. This file can then be saved as a backup and can be uploaded when required to restore the database.

Through the use of modems, PCMMC can access a DCS 400si system remotely (off-site) to make database changes or perform uploads or downloads of the customer database as if the technician were on-site.

PART 2. HARDWARE DESCRIPTIONS

CONTENTS

2.1 MAIN CABINET

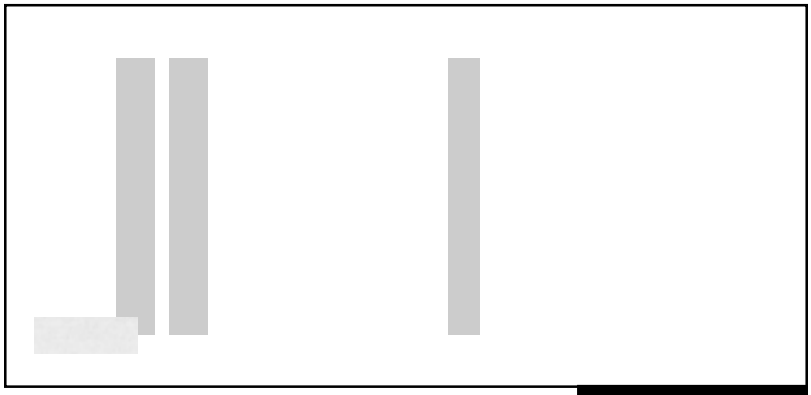


FIGURE 2–1

The main cabinet functions independently as a stand alone 192 port system or it may be combined with the expansion cabinet to make 384 ports. The cabinet is comprised of a card cage and a passive back plane enclosed in a sturdy metal cabinet that can be wall mounted or set on casters. Top, front and side panels can be easily removed for installation and servicing. The main cabinet comes with a power distribution board and AC power card mounted in the left side.

The main cabinet provides ten (10) universal card slots. A variety of interface cards for stations, trunks and miscellaneous functions are installed in these 10 slots. Dedicated slots are provided for the Common Control Processor (DCCP) and two (2) power converter units (see Figure 2–1).

An optional single line ring generator with message waiting lamp supply can be installed in the left side of the cabinet. The right side of the cabinet provides space for an optional 16 circuit power failure transfer card and functions as a cable channel for 25 pair amphenol cables to the MDF.

2.2 EXPANSION CABINET

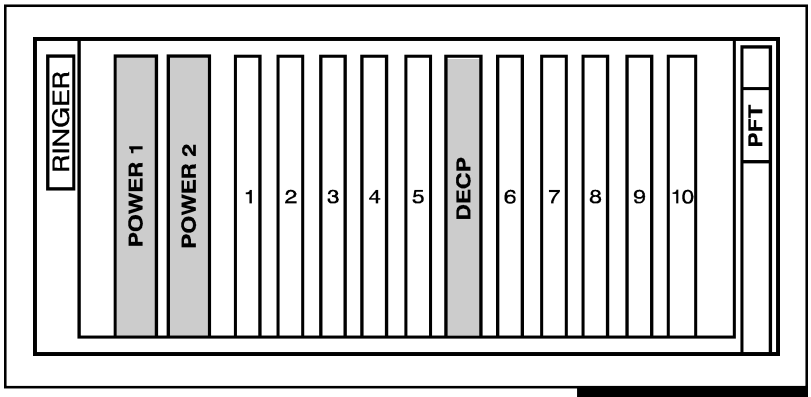


FIGURE 2–2

The expansion cabinet mounts directly on top of the main cabinet and locks in place to provide a fully expanded 384 port system. The expansion cabinet is virtually identical to the main cabinet. It also has 10 universal slots and 3 dedicated slots for 2 power supplies and an Expansion Control Processor (DECP). An optional ring generator with message waiting lamp supply and 16 circuit power failure transfer board can also be mounted in the expansion cabinet.

CONTENTS

2.3 COMMON CONTROL CARDS

CENTRAL CONTROL PROCESSOR (DCCP)

The DCS 400si system must have a DCCP card which contains the system software on the DROMD daughterboard. The DCS 400si Central Control Processor (DCCP) controls the system operation. The DCCP installs in the DCCP/ECCP slot in the first cabinet of the system. The DCCP is required for a one cabinet or two cabinet system operation. The DCCP has a 256 time slot switch matrix and 4 DTMF DSP receivers built in. With a two cabinet system a D4SWD daughterboard must be installed on the DCCP to expand the switch matrix to 512 time slots. The addition of the D4SWD board also provides 16 DTMF receivers. The DCCP supports the following options.

- 8 position DIP Switch (make busy IO, T1 clocking and default numbering plan)
- Manual reset switch
- MOH Volume Control
- 2 Page Relays (via 6 pin modular jack #1)
- External Page Output / External MOH Input (via 6 pin modular jack #2)
- MOH Internal Melody chip
- 2 SIO ports (RS-232c-9pin) (1 built-in and 1 optional)
- 8 LED's giving operational status of the CPU, major and minor alarms, T1 clocking and maintenance and administration indications.

EXPANSION CONTROL PROCESSOR (DECP)

To expand the DCS 400si to more than a single cabinet system, the expansion control processor card is required in the second cabinet. The DECP processor communicates via a high level data link control (HDLC) to the DCCP. The special HDLC cable connects the DCCP to the DECP. The DECP can have one of two types of daughterboards installed on it to increase the systems DSP resources for station use or Caller I.D. use.

2.4 INTERFACE CARDS

These cards provide the interface connections for telephone lines, stations and miscellaneous functions to the DCS 400si. These cards fit into the universal card slots in the main and expansion cabinet to configure the system as required. As the system utilizes dynamic time slot allocation each interface card is assigned only the required number of time slots or ports. This provides for more efficient use of the 384 ports.

8 UNIVERSAL TRUNK CARD (D8UTK)

The DCS 400si 8 port Universal Trunk card is selectable on a per circuit basis for loop start, ground start, DID and E&M tie line type trunks. All trunk types supported are software programmable. It can be inserted into any universal slot. Each D8UTK uses 8 ports.

16 CIRCUIT TRUNK CARD (D16TK)

The DCS 400si 16 port Trunk card provides 16 loop start trunks. The D16TK supports Caller ID service and can be inserted into any universal slot. Each D16TK uses 16 ports.

CONTENTS

DIGITAL TRUNK CARD (DTPRI)

The Digital Trunk Card (DTPRI) supports either T1 or PRI (ISDN) service. The DCS 400si supports six T1/PRI cards per cabinet or a total of 12 per system. The five LEDs on the front of the card provide indications for Activity, Synchronization, Loss of Signal, Alarm Indicating Signal and Level 2 Activity. It can be inserted into any universal slot and uses 24 ports.

When used as T1 service this card provides up to 24 circuits in any combination of the following signaling protocols:

- Loop start
- Ground start
- DID (Direct Inward Dialing)
- E & M tie trunk or two way DID calling

NOTES: Caller ID is not available on T1 span but Automatic Number Identification (ANI) via inband DTMF signaling is supported.

When used for ISDN–PRI service, this card can support National ISDN (NI2), No. 5 ESS, and DMS 100 custom protocols. It can be inserted into any universal slot. This card provides up to 23 ISDN “B” channels and 1 ISDN “D” channel.

8 BRI (BASIC RATE INTERFACE–D8BRI)

The 8 BRI card supports 8 trunk or station level ISDN Basic Rate Interface (i.e., 2B plus D) circuits. The nine LEDs on the front of the card provide ISDN (Layer 2 protocol) activity indications per BRI circuit and one busy/idle LED. The DCS 400si supports 20 BRI S/T (station or trunk) interface cards. It can be inserted in any universal slot. Each D8BRI uses 16 ports.

24 DIGITAL LINE INTERFACE (D24DL)

The digital line interface card provides service to all DCS keysets, 32 button AOM, serial interface module (SIM), door phone interface module (DPIM) and the 64 button module.

This card is a twenty four circuit digital station interface card that provides selectable 1B+D service or 2B+D service. It can be inserted into any universal card slot. When selected for 2B + D service each card uses 48 ports instead of 24. When selected for 1 B + D service each card uses 24 ports.

16 SINGLE LINE INTERFACE with MESSAGE WAITING (D16SL)

This card is a sixteen circuit analog station interface for industry standard single line telephones or other analog peripheral devices (voice mail, etc.). It provides the overvoltage protection required for connection to the telephone company off premises extension circuits (OPX). Industry standard Message Waiting voltage for single line message waiting lamps is also provided by this card. It can be inserted into any universal card slot. Each D16SL uses 16 ports.

CONTENTS

24 SINGLE LINE INTERFACE (D24SL)

This card is a twenty four circuit analog station interface for industry standard single line telephones or other analog peripheral devices. The 24 SLI does **NOT** contain any over-voltage protection and does not qualify as OPX. It can be inserted into any universal card slot. Each D24SL uses 24 ports.

KEYSET DAUGHTERBOARD –DLI (KDb-DLI)

This is a small daughterboard that can be installed inside any 24 or 12 button DCS keyset. The KDb-DLI will provide one additional DLI circuit for the connection of any digital station device such as a keyset, add-on module, SIM or DPIM. This KDb-DLI will only operate when the keyset is connected to a DLI card that is set for 2B+D operation so it can use the second B channel. The KDb-DLI can not be installed in a 7B keyset.

KEYSET DAUGHTERBOARD–SLI (KDb-SLI)

This is a daughterboard that can be installed inside any 24 or 12 button DCS keyset. The KDb-SLI will provide one additional SLI circuit for the connection of any standard telephone device. This KDb-SLI will only operate when the keyset is connected to a DLI card that set for optioned for 2B+D operation so it can use the second B channel. The KDb–SLI can not be installed in the 7B keyset.

NOTE: The circuitry on a KDb-SLI does not provide a physical loop open disconnect signal or have the overvoltage protection necessary for OPX operation.

AUTO ATTENDANT / UCD (DAAUP)

This optional card can be used for either the Automated Attendant, Uniform Call Distribution or a combination of both. Each DAAUP card provides 8 ports of automated attendant and memory for four (4) minutes of recorded announcements for either AA or UCD operation. A maximum of 5 DAAUP cards can be installed in either a single or two cabinet system. For more information about the Automated Attendant and UCD, see section 4.1 System Features.

MISCELLANEOUS APPLICATIONS PROCESSOR 1 (DMAP1)

The optional DMAP1 card provides the following miscellaneous functions in addition to those that are on the DCCP card.

1. Four engine chips with embedded DSPs that provide 16 DTMF receivers.

2. Connectors for ONE daughterboard that can be one of the following:

   a. D4SWD capability (Provides 16 additional DTMFR)
   b. DR2CID capability (Provides 16 channel DSP for CID)

3. Miscellaneous functions:

   a. Two External MOH Volume Control
   b. Two RS232C 9 Pin Serial Input/Output

c. MOH Internal Melody #2
d. 1 Modular 6 Pin Modular Jack for External (2 inputs) MOH inputs
e. 1 Modular 6 Pin Modular Jack for External Page (2 outputs) and Alarm Contacts

The DMAP1 card must be installed in the main cabinet. There can only be one DMAP1 in a two cabinet system.

2.5 POWER SUPPLY (DPCU)

Each DCS 400si cabinet can contain either one or two plug-in power converter units (i.e., system power supply). The power converter units can be powered by either 110/220 volt AC or -48 volt DC input. The DPCU converts these input voltages to +5 volts, -5 volts and 48 volts DC output power to the DCS 400si system.

Multiple DPCUs provide a more cost efficient and serviceable method to meet the various configurations of stations and trunks. Each DPCU can power 96 devices. The devices are determined as circuits that require 48 volts DC from the system. To calculate the 48 volt load, count each device as one unit of power times the number of circuits per card. For example a 24 port DLI card (D24DL) supplies 48 VDC to each keyset so each DLI port counts as 1 power unit. Therefore each D24DL counts as 24 power units. The following interface cards use 48 VDC and count towards the total required power units.

1. D24DL (1B+D) 24 power units
2. D24DL (2B+D) 48 power units
3. D24SL 24 power units
4. D16SL 16 power units
5. 8UTRK 8 power units

Other types of interface cards do not use 48 VDC from the system supply so they should not be counted.

2.6 SYSTEM DAUGHTERBOARDS

DROMD DAUGHTERBOARD

The DCS 400si ROM daughterboard (DROMD) mounts on the DCCP and supports up to 8 Mbytes of program memory space to support the system operating program. This board is equipped with sockets and the EPROM chips that contain the system program (software) plug into these sockets. Thus, the EPROMs are plugged into this daughterboard and it is plugged as a single unit into the DCCP board. This makes it physically easier to change system software. Every DCS 400si system must be equipped with a DROMD daughterboard to operate. The EPROMs are not included with the DROMD. The software must be ordered separately.

DCDM DAUGHTERBOARD

This optional, but highly recommended, Customer Data Module board mounts on the DCCP and provides 2 Mbytes of “Super Capacitor” backed RAM memory. This allows for a separate removable database storage location on the DCCP board. Thus, it supple-

CONTENTS

ments the 2 Mbytes of on-board battery backed RAM. The purpose of the DCDM is to provide a convenient, fast, easy to use, and reliable means of restoring a database to the DCCP board. It is primarily used as:

a. a diagnostic tool to check for a faulty DCCP board
b. a means to allow defaulting the system database (e.g., to check for customer database programming problems) while still preserving the original database, and
c. a means of restoring a specific database in 2-3 minutes to a new or existing DCCP in support of a and b above.

Due to the fact that during a PCMMC database upload the system database is changing over a 25 to 30 minute period, system call processing operation must be halted during the upload process. Thus, an upload should only be done during periods of time when loss of system call processing will not affect the customer's business operations (e.g., after working hours). Consequently, providing a DCDM allows a means for rapid restoration of a system database (i.e., within a few seconds) without incurring this lengthy interruption of system call processing capability. It should be remembered that specific entries in the system database can always be changed using KMMC or PCMMC in the on-line mode without incurring the loss of system call processing produced by a full or partial PCMMC database upload.

D4SWD DAUGHTERBOARD

The DCCP must be provided with a D4SWD daughterboard to expand the system-switching matrix from 256 ports to 512 ports. However, adding this daughterboard also adds 16 DTMF receiver resources and a gain/loss controllable conference package to the system, which allows the system to provide a higher quality conference arrangement for 4 and 5 party conference calls. Now, it is possible to provide the D4SWD daughterboard to the DCCP simply to add the DTMF receiver resources and higher quality conference capability without expanding to a second shelf. Thus, in future, expanding to a second shelf becomes easy.

The DCCP has 4 DTMF receiver resources on-board, the DECP has none, and the MAP1 has 16 DTMF receiver resources on-board. Adding a D4SWD daughterboard to the DCCP increases its and the system's DTMF receiver capability to 20 (i.e., 4 on-board plus 16 on the D4SWD daughterboard). Adding a D4SWD daughterboard to the DECP adds 16 DTMF receiver resources to the system total. Finally, adding a D4SWD daughterboard to the DMAP1 board provides a total of 32 DTMF receiver resources to the system (i.e., 16 DTMF receivers on-board and 16 DTMF receivers provided by the D4SWD daughterboard).

DR2CID DAUGHTERBOARD

The DCS 400si 24-channel CID (Caller ID) detector daughterboard (DR2CID) mounts on the DCCP, DECP or the DMAP1. The DR2CID provides up to 24 receivers for CID detection maximum when plugged on to the DCCP and/or DECP cards. When the DR2CID daughterboard is plugged on to the MAP1 card, it will only provide 16 caller ID receivers (i.e., since the on-board DTMF receivers already use 16 time slots and the entire board is

CONTENTS

only allocated 32 service time slots maximum). These time slots are not associated with the 192 universal time slots.

DSIOD DAUGHTERBOARD

The DCS 400si SIO (Serial Input/Output) daughterboard mounts on the DCCP card. This DSIOD provides 1 additional isolated 9-pin RS232 serial port (i.e., in addition to the on-board 9-pin RS232 port) on the DCCP. The DSIOD 9-pin connector #2 on the DCCP has a maximum data speed of 38400 bps.

DRAD DAUGHTERBOARD

The DCS 400si 2-channel DRAD (Data Rate Adapter) daughterboard mounts on the DCCP card and allows for the use of 2 Serial Interface Modules (SIMs) on the DCS 400si system. There are no options to select on this daughterboard. SIM settings are controlled via KMMC and/or PCMMC programming.

2.7 STATION EQUIPMENT

CONTENTS

LCD 24B Keyset (see Figures 2–3 and 2–4)

- Built-in speakerphone
- 24 programmable keys (16 with tri-colored LEDs)
- Four fixed function keys
- 32 character display (2 x 16) with three associated soft keys and a scroll key
- UP/DOWN buttons for digital control of speaker, handset and ringer volumes
- Eight selectable ring tones
- Desk- or wall-mounted
- Available in almond or charcoal

FIGURE 2–3

FIGURE 2–4

STD 24B Keyset (see Figures 2–5 and 2–6)

- Built-in speakerphone
- 24 programmable keys (16 with tri-colored LEDs)
- Four fixed function keys
- UP/DOWN buttons for digital control of speaker, handset and ringer volumes
- Eight selectable ring tones
- Desk- or wall-mounted
- Available in almond or charcoal

CONTENTS

FIGURE 2–5

FIGURE 2–6

LCD 12B Keyset (see Figures 2–7 and 2–8)

- 32 character display (2 x 16) with three associated soft keys and a scroll key
- Built-in speakerphone
- 12 programmable keys (six with tri-colored LEDs)
- Four fixed function keys
- UP/DOWN buttons for digital control of speaker, handset and ringer volumes
- Eight selectable ring tones
- Desk- or wall-mounted
- Available in almond or charcoal

FIGURE 2–7

FIGURE 2–8

CONTENTS

Basic 12B Model Keyset (see Figures 2–9 and 2–10)

- Built-in speakerphone
- 12 programmable keys (six with tri-colored LEDs)
- Four fixed function keys
- UP/DOWN buttons for digital control of speaker, handset and ringer volumes
- Eight selectable ring tones
- Desk- or wall-mounted
- Available in almond or charcoal

FIGURE 2–9

FIGURE 2–10

7 Button Model Keyset

(see Figures 2–11 and 2–12)

- 7 programmable keys
- Three fixed function keys
- UP/DOWN buttons for digital control of speaker and ringer volumes
- Eight selectable ring tones
- Desk or wall mounted
- Available in almond or charcoal

FIGURE 2–11

CONTENTS

FIGURE 2–12

32 Button Add-On Module (AOM) (see Figures 2–13 and 2–14)

- 32 programmable keys with red LEDs
- Two fixed function keys
- UP/DOWN buttons for digital control of speaker and ringer volumes
- Available in almond or charcoal
- One to four can be assigned to any DCS keyset to provide executive off-hook voice announce, and additional programmable keys (see Figure 2–15)
- Can operate as a stand-alone handsfree telephone unit
- Includes ringer, microphone and speaker

FIGURE 2–13

FIGURE 2–14

CONTENTS

64 Button Module (see Figures 2–16)

- 64 programmable keys with red LEDs
- Available in almond or charcoal
- One to four can be assigned to any DCS keyset to provide additional programmable keys

FIGURE 2–15

FIGURE 2–16

CONTENTS

Door Phone Interface Module (DPIM) and **Door Phone** (see Figures 2–17 and 2–18)

- The DPIM adapts any DLI circuit for use with the door phone unit
- Commonly used to request entry through locked doors (interior or exterior) or as a room monitoring box
- Provides contact control to be used with customer-provided electric door lock
- Door phone is wall-mounted
- Door phone is weather resistant

FIGURE 2–17

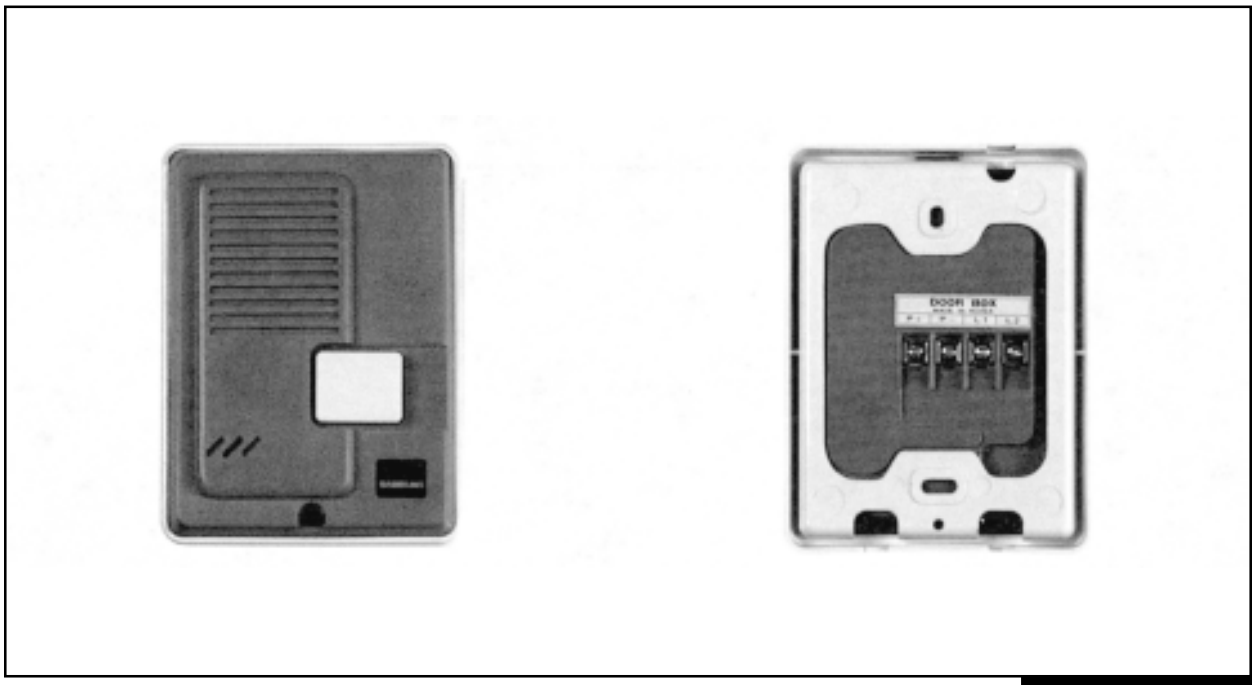


FIGURE 2–18

Serial Interface Module (SIM)
(See Figure 2–19)

- Provides an RS232 connection required for SMDR, PCMMC, TSAPI, TAPI 2.1, UCD Reports and Traffic Reports
- Connects to any DLI circuit
- Maximum of 2 per system (requires optional DRAD board on DCCP)

CONTENTS

Computer Telephony Module (CTM)
(See Figure 2–20)

- Provides RS232 connection via DB9 to a PC for TAPI applications
- Connects to any DLI port and any DCS keyset

FIGURE 2–19

FIGURE 2–20

CONTENTS

PART 3. SPECIFICATIONS

The following tables provide technical data for the DCS hybrid/key telephone system.

3.1 ELECTRICAL SPECIFICATIONS (DPCU)

AC INPUT	120 (85–135) VAC (57–63 Hz)* 240 (170–270) VAC (57–63 Hz) FUSE RATING 5 AMPS/250V
DC INPUT	43–56 VDC
POWER CONSUMPTION	157 WATTS MAX. PER POWER SUPPLY FUSE RATING 5 AMPS/250V
BTU RATING (MAX)	535 BTU per Hr. per POWER SUPPLY
DC OUTPUT	+5 VOLTS, 4.5 AMPS MAX -5 VOLTS, 0.5 AMPS MAX -56 VOLTS (-48 NOMINAL), 1.5 AMPS MAXIMUM
DC BATTERY CHARGING CURRENT	-56 VOLTS 0.4 AMPS MAXIMUM FUSE RATING 4 AMPS/250V

3.2 DIMENSIONS AND WEIGHTS

	HEIGHT	WIDTH	DEPTH	WEIGHT
DCS 400si SYSTEM: MAIN CABINET	18"	23"	14"	33 lb.
EXPANDED SYSTEM: TWO CABINETS	36"	23"	14"	67.5 lb.**
12/24 BUTTON DIGITAL KEYSET	4.25"	8.50"	9"	2.563 lb.
7 BUTTON DIGITAL KEYSET	6"	9"	4.25”	2.563 lb.
32 BTN ADD-ON-MODULE	4.25"	4.25"	9"	1.188 lb.
64 BUTTON MODULE	4.25"	4.25"	9"	1.25 lb.
DOOR PHONE	5”	3.88”	1.25”	6.8 oz.

* Normal factory setting ** Maximum Two Cabinet Overall Floor Loading–89 lbs per Sq. Ft.

CONTENTS

3.3 ENVIRONMENTAL LIMITS

OPERATING TEMPERATURE	32–104 °F/0–40 °C
STORAGE TEMPERATURE	-13–158 °F/-25–70 °C
HUMIDITY	10–90 ° Non Condensing

3.4 CABLE REQUIREMENTS

EQUIPMENT	CABLE	AWG	MAX FEET	MAX METERS
DIGITAL KEYSET	1 PR. TWISTED	24	1300	400
32 BTN MODULE	1 PR. TWISTED	24	1300	400
64 BTN MODULE	1 PR. TWISTED	24	1300	400
SINGLE LINE STATION	1 PR. TWISTED	24	3000	1 KM
DOOR PHONE	2 PR. TWISTED	24	330*	100
SIM	1 PR. TWISTED	24	1300	400

*This is the maximum distance a door phone can be from the DPIM. The DPIM can be up to 900 cable feet from the KSU. The total distance must not exceed 1230 feet.

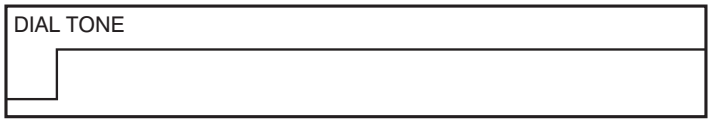
3.5 SYSTEM TONES

TONE	FREQUENCIES	CADENCE
DIAL TONE	350 + 440 Hz	CONTINUOUS
RINGBACK TONE	440 + 480 Hz	1 sec on + 3 sec off
DID RINGBACK TONE	440 + 480 Hz	2 sec on + 4 sec off
BUSY TONE	480 + 620 Hz	0.5 sec on + 0.5 sec off
DND/NO MORE CALLS	480 + 620 Hz	0.25 sec on + 0.25 sec off
TRANSFER/CONF	350 + 440 Hz	0.1 sec on + 0.1 sec off
CONFIRMATION TONE	350 + 440 Hz	0.05 sec on + 0.05 sec off
ERROR TONE	480 + 620 Hz	0.05 sec of tone 1/0.05 sec of tone 2

CONTENTS

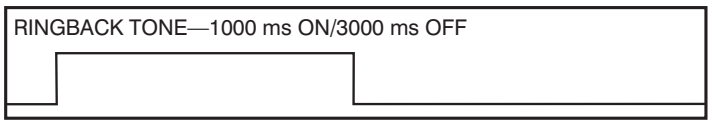
SYSTEM TONES

Intercom Dial Tone—A steady tone that indicates you can begin dialing.



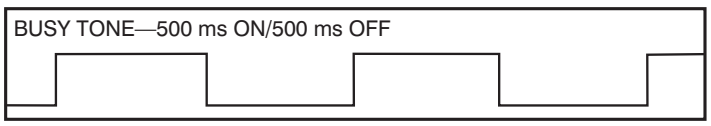
CONTINUOUS

Ringback Tone—Indicates the station you dialed is ringing.



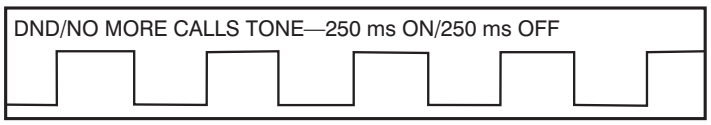
CONTINUOUS

Busy Tone—Indicates the station you dialed is busy.



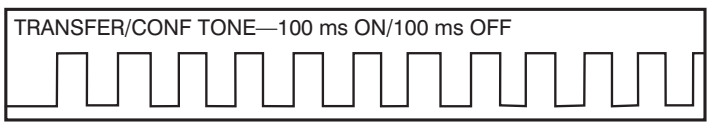
CONTINUOUS

DND/No More Calls Tone—Fast busy tone indicates the station you dialed is in the Do Not Disturb mode or cannot receive any more calls.



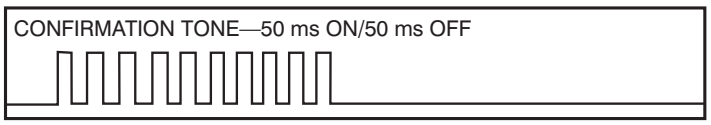
FOR TEN SECONDS

Transfer/Conference Tone—Indicates your call is being held and you can dial another party.



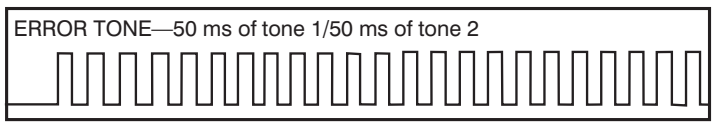
CONTINUOUS

Confirmation Tone—Very short beeps followed by dial tone indicate you have correctly set or canceled a system feature.



FOR ONE SECOND (programmable)

Error Tone—A distinctive two level beeping tone indicates you have done something incorrectly. Try again.



FOR THREE SECONDS

CONTENTS

3.6 KEYSET LED INDICATIONS

CONDITION	LED COLOR	LED ON	LED OFF
LINE IDLE	OFF	–	OFF
LINE IN USE	RED/GREEN	STEADY	–
RECALL	AMBER	500 ms	500 ms
CALL ON HOLD	RED/GREEN	500 ms	500 ms
RINGING C.O. CALL	GREEN	100 ms	100 ms
RINGING INTERNAL CALL	GREEN	100 ms	100 ms
DND INDICATION	RED	112 IPM for 500 ms	500 ms
OPERATOR CALLS	RED	100 ms	100 ms
ANS/RLS (DND)*	RED	112 IPM for 500 ms	500 ms
ANS/RLS (HDSET MODE)	RED	STEADY	–
TRSF (FORWARD ALL)	RED	STEADY	–

*Overrides headset mode

3.7 RESERVE POWER DURATION ESTIMATES (in minutes)*

No. of Cabs.	No. of PCUs	UPS CAPACITY IN VOLT AMPS (VA)						
		250	400	450	600	900	1250	2000
1	1	5	13	24	31	47	75	180
1	2			8	10	24	40	70
2	2			8	10	24	40	70
2	3					13	22	35
2	4					10	13	25

*These are approximate values based on average UPS run times. Specific UPS devices, due to their internal contruction, can have greater or lesser values.

CONTENTS

3.8	SYSTEM CALL CAPACITY
BHCA	4,000

PART 4. FEATURES

SYSTEM FEATURES

†Requires optional hardware and/or software. Ask your dealer for details.

4.1 SYSTEM FEATURE DESCRIPTIONS

ACCOUNT CODE ENTRY

Station users may enter an account code (maximum 12 digits) before hanging up from a call. This account code will appear in the SMDR printout for that call record. Keyset users may enter this code using an account (ACCT) key without interrupting a conversation. Single line telephone users must temporarily interrupt the call by hook-flashing and dialing the feature access code. Account codes can be up to 12 digits long.

FORCED

When forced, they are always verified from a system list of 500 entries. Account codes are always printed on the SMDR report. They can contain digits 0–9 only.

VOLUNTARY

Users may elect to enter an account code for any call. They can contain digits 0–9, ✱ and #. There is no limit to the number of voluntary account codes because they are not stored in system memory.

ALL CALL VOICE PAGE

Users can page all internal and all external paging zones at the same time by dialing the All Page code. Keysets may be restricted from making or receiving pages in system programming. A maximum of 99 keysets can be programmed to receive page announcements.

ATTENTION TONE

To get your attention, a brief tone precedes all page announcements and intercom voice calls. There are separate programmable duration timers for page and voice announce tones.

AUTHORIZATION CODES

Authorization codes are used to give permission to make a call. A maximum of 250 four digit authorization codes can be either forced or voluntary. When used, authorization codes will automatically change the dialing station's class of service to the level assigned to the authorization code. Authorization codes may be programmed to print or not print on SMDR.

FORCED

When a station is programmed for forced authorization, the user must always enter this code before dialing is allowed. The dialed authorization code is verified from the system list of 250 authorization codes.

VOLUNTARY

Any station user can always enter an authorization code before they begin dialing. The dialed authorization code is verified from the system list of 250 authorization codes.

AUTO ATTENDANT

The integrated digital automated attendant feature (DAAUP) provides eight ports per card for simultaneous answering and call processing. A maximum of five cards can be installed in one system. Each sixteen professionally recorded announcements inform callers of the progress of their calls. Several examples are the following: “I’m sorry. There is no answer,” “That station is busy” and “Invalid number. Please try again.” A maximum of four minutes of super capacitor backed (100 hours) random access memory (RAM) provide up to 48 customer recordings for announcements or greetings. Twelve individual announcements (boxes), each with its own dialing options, allow you to build call routing branches as needed. Callers are routed through the branches by dialing extension numbers or single digits. This system is compatible with Starmail and Cadence.

NOTE: Announcements recorded on one DAAUP card can not be played to callers on another DAAUP card.

AUTOMATIC HOLD

While a keyset user is engaged on an outside (C.O.) call, pressing another trunk key, route key or CALL button automatically places the call on hold when Automatic Hold is enabled. Pressing TRSF, CONFERENCE, PAGE or a DSS key always automatically places a C.O. call on hold. Intercom calls can be automatically held only by pressing TRSF or CONFERENCE. Each keyset user can enable or disable Automatic Hold.

BACKGROUND MUSIC

Keyset users may choose to hear music through their keyset speakers when optional external sources are installed. Each user may adjust this level by the use of a volume control program at the selected keyset.

CADENCE–INTEGRATED VOICE MAIL

The 400si can be equipped with Samsung’s proprietary integrated voice mail and auto attendant card (CVM16A) It provides 4–16 ports of voice processing, expandable in four port increments. Because it is built into the system it provides such feature as one touch Call Record, Answering Machine Emulation and Voice Mailbox Administration with interactive keyset displays. Ask your dealer for literature on CADENCE.

CALL COSTING

The 400si provides programmable call costing tables to calculate the cost of incoming and outgoing calls. Rates are calculated by the number dialed, time of day, day of week and may include surcharges. Display keysets can be set to show the call duration timer or the call cost. The SMDR report will show either the call duration or the call cost depending on the station selection. One call handled by multiple callers will cost each call segment separetely.

CONTENTS

CALLER IDENTIFICATION

AUTOMATIC NUMBER IDENTIFICATION (ANI)

With ANI service display keyset users can see the telephone number of the calling party. This service is only available from a long distance telephone company over a digital trunk. A name can be associated with a specific ANI number in the CID/ANI translation table. ANI numbers and names can be used with the following caller identification features as noted.

CALLER ID

The Caller ID feature requires that optional hardware be installed in the DCS 400si System. In addition, Caller ID service must be provided by your local telephone company. The availability of the calling party name or number depends on the type of CID service offered by your local telephone company. The Caller ID feature is dependent on having an LCD keyset to show the name or number in the top line of the display. Caller ID names and numbers can be used with the following identification features as noted.

NAME/NUMBER DISPLAY

Each LCD keyset user can decide if he/she wants to see the CID name or CID/ANI number in the display. Regardless of which one is selected to be seen first, the NND key is pressed to view the other pieces of CID or ANI information.

NEXT CALL

In the event that you have a call waiting or a camped-on call at your keyset, you can press the NEXT key to display the Caller ID or ANI information associated with this next call in queue at your station. Either the CID name or CID/ANI number will show in the display depending on your N/N selection.

SAVE CID/ANI NUMBER

At any time during an incoming call that provides CID/ANI information, you may press the SAVE key. This saves the CID or ANI number in the Save Number feature. Pressing the SAVE number redial key will dial the CID/ANI number. The system must be using Least Cost Routing (LCR) to save and dial saved number.

STORE CID/ANI NUMBER

At any time during an incoming call that provides CID or ANI information, you may press the STORE key. This saves the CID/ANI number as a speed dial number in your personal speed dial list. The system must be using LCR to dial the stored number.

INQUIRE PARK/HOLD

Having been informed that an incoming call is on hold or has been parked, you may view the Caller ID or ANI information before you retrieve the call. This may influence how you choose to handle the call.

CONTENTS

CID/ANI REVIEW LIST

This feature allows display keyset users to review CID/ANI information for calls sent to their stations. This list can be from ten to fifty calls in a first in, first out basis. The list includes calls that you answered and calls that rang your station but that you did not answer. When reviewing this list, you can press one button to dial the person back. The system must be using LCR to dial the stored number.

INVESTIGATE

This feature allows selected stations with a special class of service to investigate any call in progress. If CID/ANI information is available for an incoming call, you will know to whom this station user is speaking. On outgoing calls, you can see who was called. After investigating, you may barge-in on the conversation, disconnect the call or hang up.

ABANDON CALL LIST (100)

The system has a system-wide abandon call list that stores CID/ANI information for the last 100 calls that rang but were not answered. The list is accessed using the administrator's passcode. When reviewing this list, you are provided options to CLEAR the entry or DIAL the number. You can use the NND key to toggle between the CID name, CID or ANI number and the date and time the call came in. The system must be using LCR to dial numbers from the abandon call list.

CID/ANI ON SMDR

The Station Message Detail Records report can be set to include CID/ANI name and CID/ANI number for incoming calls. This format expands the printout to 113 characters. Use a wide carriage printer or an 80 column printer set for condensed print.

NUMBER TO NAME TRANSLATION (1500)

The system provides a translation table for 1500 entries. When the CID or ANI number is received, the table is searched. When a match is found, the system will display the corresponding name. This will allow users in areas that do not support deluxe Caller ID or only have ANI service to provide names for regular callers.

CALL FORWARDING

This feature allows the user to redirect (forward) incoming calls. The calls can be redirected to the attendant, a hunt group, voice mail, external number or another station user. If the destination station is in Do Not Disturb (DND), the calling party will receive DND/Reorder tone. Calls cannot be forwarded to a door phone.

ALL CALLS

This type of forwarding is not affected by the condition of the station. All calls are immediately redirected to the designated destination. If desired, the destination station may redirect the call back to the forwarded station by using the transfer

CONTENTS

feature. The forwarded station user can continue to originate calls as usual. If no key is programmed as Forward All, the TRSF key lights steady when a Forward All condition is set.

BUSY

This feature forwards all calls only when the station set is busy. The station user can originate calls as usual.

NO ANSWER

This feature forwards calls that are not answered within a preprogrammed time. The user can originate calls as usual and receive calls if present. The timer is programmable on a per-station basis to allow for differences in individual work habits.

BUSY/NO ANSWER

This feature allows the station user to use both types of forwarding simultaneously, provided the destinations have already been entered in the usual manner.

FORWARD DND

This feature works with the Do Not Disturb feature. This allows calls directed to a station in Do Not Disturb or One Time Do Not Disturb to forward immediately to another destination.

FOLLOW ME

This feature allows the user to forward all calls from another station to the user's station or change the forward destination to the user's current location.

EXTERNAL

This feature forwards C.O. calls to an external number via a central office trunk if allowed by class of service. These C.O. calls forward only after the programmable external call forward delay timer expires.

TO VOICE MAIL

Each station may be programmed to allow or deny the ability to forward intercom calls to voice mail. When denied, valuable message time in the voice mail system can be saved.

PRESET DESTINATION

If desired this feature provides for a permanent (preset) forward no answer destination for each extension. It can only be programmed by the system technician or system administrator. When any station does not have FWD/NO-ANSWER set, the call will ring this preset destination if one is programmed.

CONTENTS

CALL HOLD (EXCLUSIVE)

Outside calls can be placed on exclusive hold at any keyset by pressing HOLD twice during a call. Calls placed on exclusive hold can only be retrieved at the keyset that placed the call on hold. Intercom calls are always placed on exclusive hold.

CALL HOLD (SYSTEM)

Outside calls can be placed on system hold at any station. Users may dial the access code or press the HOLD button. Calls on system hold may be retrieved at any station.

CALL HOLD (REMOTE)

Outside calls can be placed on hold at a remote station. This feature allows calls to be answered at one keyset and placed on hold at another station. This allows time for the user to proceed to that station or allows the party that the call was intended for to have that call placed at their station. The call or trunk button will flash at the remote hold station.

CALL PARK AND PAGE

Each C.O. line has its own park zone. This simple method eliminates confusion and ensures that a park zone is always available. Pressing the PAGE key parks the call automatically. There are no extra buttons to press and there is no lost time looking for a free zone.

CALL PICKUP

DIRECTED

With directed call pickup, users can answer calls ringing at any station by dialing a code plus that station's extension number or by pressing the feature button and then dialing the extension.

GROUPS (20)

In addition, calls can be picked up from a station group in a similar manner. The group pickup feature allows users to answer any call ringing within any pickup group. There are 20 pickup groups available. A station cannot be in more than one pickup group. To use this feature, station users either dial the access code or press the assigned feature button followed by the pickup group number.

ESTABLISHED

This feature enables a keyset user to pick-up an establish call in progress at a single line extension connected to a modem on a PC. An EP key with this extension number must be programmed on the keyset. Established call pickup is useful with PC dialing programs that outdial from a large list of telephone numbers. Let the computer dial for you, then press the EP key to speak with the called party.

CALL WAITING/CAMP-ON

Busy stations are notified that a call is waiting (camped-on) when they receive a

CONTENTS

tone. The tone is repeated at a programmable interval. Keysets receive an off-hook ring signal through the speaker and single line stations receive a tone in the handset. The volume of the camp-on tone can be set by the station user. Camped-on calls follow Forward No Answer if a Forward No Answer destination has been set.

Optionally any station can be programmed to automatically camp-on to a busy station instead of having to press the camp-on button or dial a camp-on code.

CENTREX/PBX USE

CENTREX and PBX lines can be installed in lieu of central office trunks. CENTREX and PBX feature access codes including the command for hook-flash (FLASH) can be stored under one touch buttons. Toll restriction programming can ignore PBX or CENTREX access codes so that toll calls can be controlled when using these services.

CHAIN DIALING

Keyset users may manually dial additional digits following a speed dial call or chain together as many speed dial numbers as are required.

CLASS OF SERVICE

The system allows a maximum of 30 station classes of service. Each class of service can be customized in memory to allow or deny access to features and to define a station's dialing class. Each station can be assigned different classes of service for day and night operation.

COMMON BELL CONTROL

The DCCP card provides two relays to control a customer-provided common bell or common audible device. These contacts must be programmed as members of a station group and may provide steady or interrupted closure.

CONFERENCE

The system allows six simultaneous conferences up to 5 parties each.

ADD-ON (5 PARTY)

Any combination of up to five parties (stations or outside lines) can be joined together in an add-on conference. Parties may be eliminated or added after a conference has been established. *Requires D4SWD to provide gain control when 3 or more trunks are in the conference.

UNSUPERVISED

A station user may set up a conference with two or more outside lines and then exit the conference leaving the outside lines connected in an unsupervised (trunk to trunk) conference.

SPLIT

A keyset user can "split" a conference into separate outside calls, then speak with each caller privately. Then the individual calls can be conferenced again in any combination.

CONTENTS

NOTE: This feature requires individual trunk buttons and auto-hold must be enabled.

COMPUTER TELEPHONY INTEGRATION (CTI)

Computer Telephone Integration (CTI) allows integration between the DCS 400si and a personal computer system (PC) or a local area network (LAN). Caller ID or ANI service is required for TAPI and TSAPI inbound call applications that use the CID/ANI information to display computer records in conjunction with the presentation of the call to the station on the DCS 400si. TAPI and TSAPI are described below.

TAPI

Jointly developed by Intel and Microsoft, TAPI (Telephony Applications Programming Interface) delivers telephony features to the Windows desktop. TAPI is an open application interface (OAI) protocol that supports First Party Call Control. A Computer Telephony Module (CTM) is required to connect any keyset to a personal computer running Windows 3.1 or Windows 95. The number of CTMs that can be installed on a system is only limited to the number of keyphones. The features and functionality of the 400si keyset are not changed.

TSAPI

Telephony Services Application Programming Interface (TSAPI) was developed by Novell and AT&T and is the method of integrating the DCS 400si system to a computer. TSAPI is a LAN based solution allowing computers to communicate directly to the telephone system over the network system. This establishes a logical connection rather than a physical connection between telephone and computer. It eliminates the cost and administrative overhead of connecting every PC to a desktop phone. It emphasizes third-party call control. (Example: calls can be tracked as they are transferred, making it more suited to large office applications). TSAPI can emulate first-party type call control for the 400si system, rather than from the telephone as TAPI does. For example, to make a call the 400si, rather than the telephone would dial the phone number, and the call would be then transferred to the telephone. Novell Telephony Services 2.1 or higher specifies the data communications link between the Novell Netware file server running the Netware Telephony Services NLM and the Samsung 400si. The physical connection from the Novell Telephony server to the DCS 400si is an EIA-232 connection via a Samsung Serial Interface Module (SIM).

CUSTOMER SET RELOCATION

Customer Set Relocation allows the customer to exchange or swap similar stations in the 400si without wiring changes. All individual station assignments such as trunk ring, station group, station COS, station speed dial, button appearances, call forwarding, etc. will follow the Customer Set Relocation program.

CONTENTS

DATA SECURITY

Single line extensions used with modems and facsimile machines can be programmed so that they will not receive any system-generated tones that would disrupt data transmissions. In addition, these devices receive C.O. ringing pattern instead of intercom ring pattern. Devices connected to an SLI card receive a disconnect signal upon termination.

DATABASE PRINTOUT

A copy of the customer database can be obtained by using PCMMC. This information can be directed to a printer or the PC screen and may be done either on-site or remotely. A complete database or specific data blocks may be obtained.

DIALED NUMBER IDENTIFICATION SERVICE (DNIS)

When DNIS service is provided on an incoming trunk the DCS 400si can route calls based on the numbers received.

DIRECT IN LINES

Outside lines may be programmed to bypass the operator(s) and ring directly at any station or group of stations.

DIRECT INWARD DIALING (DID) T1/COPPER

The DCS 400si can use local telephone company-provided DID service via a T1 span or D8UTK card. When programmed, anyone dialing a user's personal number rings directly to that user's office. DID calls to a busy station have the option to return busy signal to the C.O. or return ringback to the C.O. When ringback is selected, the called station receives off-hook ring. Multiple DID numbers can ring the same extension or station group and display keysets show a DID directory name when ringing if a name has been programmed. DID calls can be assigned to the six ring plan destinations. This allows routing of DID calls that have different destinations to be routed to other destinations at different times. DID calls that are directed to ring a voice mail machine can be identified by a special digit (see Voice Mail Integration). It is also possible to program E & M trunks to follow the DID translation tables, allowing the system to use both way DID type service. DID pass through also allows DID digits to be repeated on an outgoing trunk. This permits DID calls to be sent to a second system while the DID service is at one location.

DIRECT INWARD SYSTEM ACCESS (DISA)

Users can call in on specific DISA lines at any time, input a security code and receive system dial tone or a music source. Users can now place internal calls or if permitted, calls using C.O. lines. The caller must have a tone dial phone and know his/her DISA security code. DISA lines can be used as both way lines or incoming only. The C.O. lines used for DISA must have disconnect supervision. The requirement to put in a DISA security code can be disabled if desired.

CONTENTS

DIRECT TRUNK SELECTION

Each station can be allowed access to or denied access from a trunk or trunk group by access code when LCR is activated. When restricted, the station user must use a trunk key or a route key.

DIRECTORY NAMES

Each station, station group and C.O. line may be assigned a directory name (maximum 11 characters). In addition, each personal speed dial number, system speed dial number and entry in the DID translation table may be assigned a name (maximum 11 characters). These names are displayed during calls with these ports and in the case of station and speed dial names, can be used to originate calls. See the Dial by Name feature (Display Features).

DISA SECURITY

Telephone fraud and long distance thefts are a serious concern. The 400si provides a strong DISA security system. If an incorrect DISA passcode is entered repeatedly (as is the case with “hackers”), the DISA system can be automatically disabled temporarily. Both the number of incorrect passcode attempts and the time that DISA is disabled are programmable. In addition, all failed attempts to access DISA print on SMDR (if provided) with a “DE” DISA error flag.

DISTINCTIVE RINGING

A user knows the type of call received by the type of ring heard. Outside calls have a single ring repeated while internal calls have a double ring repeated.

In addition any trunk or station can be programmed to ring a keyset with a predefined ring tone (1–8) or a single line port with a predefined cadence (1–5) selection. This provides for easy identification of special lines or extensions that ring your phone.

DOOR LOCK RELEASE (PROGRAMMABLE)

After answering a call from the door phone, users can dial a code to activate a contact closure. This can be used to operate a customer-provided electric door lock release mechanism. The contact closure timer is programmable from 100–2500 ms.

DOOR PHONES

The door phone interface module (DPIM) provides for connection of a door phone to a DLI port. Pressing the button on the door phone produces a distinctive ring (three short rings repeated) at the assigned station or station group. If not answered within a programmable time, the system releases the door phone and stops the ringing. Stations may call the door phone directly and monitor the surrounding areas. Door phones follow the system ring mode plan.

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E & M TIE LINES (T1/COPPER)

Your office can be connected to another office with a tie line. Use it to make calls to stations in the other system. If programming allows, you can access lines in the other system to make outside calls. Tie line calls can be put on hold, transferred and conferenced in the same way as are other outside calls. Users accessing the tie line from the other system can get a line in your system and make outgoing calls. These calls can be controlled by assigning a dialing class to the tie line. Your local telephone company may use E&M tie lines to provide DID service. In this case these tie lines can be programmed to follow the DID translation table. See DID. Translated E & M tie line calls have Day and Night routing capabilities.

EXECUTIVE BARGE-IN (OVERRIDE)

The feature allows specially programmed stations with a barge-in key to override the automatic privacy of another station or monitor an outside trunk. Programming allows barge-in with or without a warning tone. Stations may also be programmed as “secure” so that they cannot be barged-in on.

WITH WARNING TONE

When the barge-in with tone option is set, the barging-in keyset has its microphone on and the barged-in on station receives an override display. A double burst of warning tone sounds and repeats every ten seconds. This feature does not work from single line sets.

WITHOUT WARNING TONE

When the barge-in without tone option is set, the barging-in keyset has its microphone muted and the barged-in on station does not receive an override display. This feature does not work from single line sets.

TRUNK MONITOR or SERVICE OBSERVING

This feature allows the user who barged-in to retain the trunk call after the original station has hung up.

WARNING: BARGE-IN WITHOUT TONE MAY VIOLATE STATE OR FEDERAL LAWS CONCERNING THE RIGHT TO PRIVACY. SAMSUNG TELECOMMUNICATIONS AMERICA IS IN NO WAY RESPONSIBLE FOR THE POSSIBLE MISUSE OF THIS FEATURE.

EXECUTIVE/SECRETARY POOLING

Each keyset may be defined as a BOSS or a SECRETARY in system programming. Each BOSS can have up to four SECRETARIES and each SECRETARY can have up to four BOSSES. These arrangements are known as executive/secretary pools. There can be multiple pools in a system. When a BOSS is in DND, all calls to the BOSS ring the first SECRETARY assigned to that BOSS; if that SECRETARY is busy, the call hunt to the next available SECRETARY assigned to that BOSS. If the SECRETARY must communicate with the BOSS while he/she is in DND, pressing the corresponding BOSS button on the SECRETARY’s keyset re-

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sults in an Auto Answer intercom call being made to the BOSS (providing the BOSS is free). A station can only be the BOSS of one SECRETARY pool. In addition, a station cannot be in more than one pool.

EXTERNAL MUSIC INTERFACES

The 400si provides an interface for connecting a customer-provided external music source. Additional two sources can be provided with additional hardware. These sources can be used for background music, station music on hold, trunk music on hold and transfer music on hold.

EXTERNAL PAGE INTERFACES

The DCS 400si common control card (DCCP) provides one external page output and two zone control relays. Resources from an added miscellaneous applications card (DMAP1) can be combined to provide two external zones. Multiple relays may be assigned to each zone.

FLASH KEY OPERATION

While a user is on an outside line, pressing the FLASH key will flash the central office or PBX. This is used for custom calling features on C.O. lines or in conjunction with CENTREX/PBX operation. System programming allows individual flash times for C.O. and PBX lines. When C.O. or PBX flash is not required, setting the timers for two seconds releases the existing call and returns dial tone to make a new call.

FLEXIBLE NUMBERING

System programming allows stations to have two, three or four digit extension numbers beginning with the digit 2 or 3. Three digit default extension numbers begin with 201 and four digit defaults begin with 2001. Station group numbers can be three or four digits beginning with the digit 5.

Using digits other than 2, 3 or 5 will require the technician to change other feature access codes in the system default numbering plan. User guides will need to be modified as these are all written using the 400si default numbering plan.

GROUND START TRUNKS (T1/COPPER)

The 400si can utilize these trunks to support a positive disconnect signal and prevent call collisions on heavy traffic usage. Caller ID or ANI service is not available on these trunks.

HOT LINE

Stations can be programmed to call a pre-defined station or station group whenever that station goes off-hook. A hot line delay timer of 1–250 seconds can be programmed to allow sufficient time to make a different call.

IN GROUP/OUT OF GROUP

Individuals assigned to a station hunt group may temporarily remove their telephones from the group by pressing the In/Out of Group button providing that there

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is someone still in the group. Stations out of a group will not receive calls to that group but will continue to receive calls to their individual extension numbers. When desired, the user may put him/herself back into the group by pressing the button again. Users who do not have this button may dial the access code and the group desired. A station user is allowed to be in several groups, providing a key and the extender of that group are assigned for each group on the user's phone.

INCOMING CALL DISTRIBUTION

Incoming calls can be assigned to ring a distributed station hunt group. This allows all members of the group to share the call load.

INCOMING/OUTGOING SERVICE

Outside lines are available for incoming or outgoing service. Programming allows any outside line to be used for incoming calls only, outgoing calls only or both way service.

INDIVIDUAL LINE CONTROL

Each station in the system can be individually programmed to allow or deny dialing out as well as allow or deny answering for each outside line.

ISDN SERVICE

PRIMARY RATE INTERFACE (PRI)

The DCS 400si supports Primary Rate Interface ISDN. PRI allows simultaneous data calls, calling party and calling line identification , high speed call setup and disconnect are among the benefits if ISDN calling. The 23B+D configuration of ISDN allows call information to be delivered via the data channel (the "D" of 23B+D) thus leaving the bearer channels (the "B" of 23B+D) available for single use or combined use to provide a wider bandwidth for data and video. The 400si supports the most popular protocol standards in the U.S.

PRI Protocols supported: National ISDN-2 (NI2),
AT&T No. 5 ESS Custom
DMS 100/250

BASIC RATE INTERFACE (BRI)

The DCS 400si BRI card supports trunk or station level Basic Rate Interface services (BRI). Trunk or station BRI use is software programmable. BRI allows simultaneous data calls, called party and calling number identification, high speed call setup and disconnect are among the benefits if ISDN calling. The 2B+D configuration of ISDN allows call information to be delivered via the data channel (the "D" of 2B+D) thus leaving the bearer channels (the "B" of 2B+D) available for single use or combined use to provide a wider bandwidth for data and video.

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LEAST COST ROUTING

Least Cost Routing (LCR) is the ability to automatically select the most cost effective central office route for the outside number dialed by any station. The DCS 400si LCR program includes the following features:

- Option to use or not use LCR on a tenant basis
- Programmable LCR access code
- Digit analysis table 3000 entries each with ten digits
- Routing by time of day and day of week (4 time bands per day)
- Routing according to individual station class
- Modify digits table 500 entries
- Flexible trunk group advance timer
- Option to use or not use trunk group advance warning tones

LIVE SYSTEM PROGRAMMING

The system can be programmed from any display keyset or personal computer without interrupting normal system operation. There are three levels of programming: technician, customer and station. The technician level has access to all programs and can allow the customer access to system programs as needed. Technician and customer access are controlled by different security passcodes. Programming from a PC requires the PCMMC program.

MEET ME PAGE AND ANSWER

After a user makes a Meet Me Page, the user may remain off-hook to allow the paged party to meet the user for a private conversation.

MEMORY PROTECTION

In the event that power is lost to the system, all customer data contained in memory is retained by the use of a lithium battery for approximately one year. In addition, the PCMMC computer program may be used to produce a backup copy of the customer data. Additionally, an optional DCDM daughterboard may be used to store the system database.

MESSAGE WAITING INDICATIONS

When calling a station and receiving a busy signal or the no answer condition, the caller can leave an indication that a message is waiting. The message button will flash red at the messaged keyset. A single line phone can receive a distinctive message waiting dial tone or a message lamp indication. Five message waiting indications can be left at any station.

MICROPHONE ON/OFF PER STATION

The microphone can be disabled at any keyset. When the microphone is disabled, the keyset cannot use the speakerphone, although on-hook dialing and group listening are still possible.

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MUSIC ON HOLD—FLEXIBLE

With external music on hold sources connected, each C.O. line may be programmed to receive one of the external sources, internally-generated tones, chime music or no music when it is placed on hold. If there are no external sources installed, each line may receive either a system-generated tone or no music. The system-generated tone is a beep every ten seconds. The DCCP card provides an internally chimed music source playing Green Sleeves and the DMAPI internally chimed source playing Home on the Range.

OFF PREMISES EXTENSIONS (OPX)

A single line (tip and ring) extension from an 16SLI card may be connected to telephone company-provided OPX circuits to remote locations. D24SL cards and KDb-SLIs do not support off premises extensions.

OPERATOR GROUP

The operator group can contain 32 stations to answer incoming calls. Calls to this group can be set for distributed, sequential or unconditional ringing. Operators can use the In/Out of Group feature to meet flexible operator requirements. There can be only one (1) operator group per tenant.

OVERFLOW

OPERATOR

When calls ringing to the operator group go unanswered, they can overflow to another destination after a programmed period of time. The operator group has its own timer. The overflow destination can be a station or station group.

STATION GROUP

When calls ringing a station group go unanswered, they can overflow to another destination after a programmed period of time. Each station group has its own timer. The overflow destination can be a station or station group.

PAGING

System software allows the use of four internal and four external paging zones. Stations can page any individual zone, all internal zones, all external zones or all zones simultaneously. Using system programming, each station may be allowed or denied the abilities to make and/or receive page announcements to any zone or combination of zones.

PARK ORBITS

The system has 10 park orbits (0–9). These orbits can be used to park calls prior to paging and allows the call to be retrieved by dialing a park code plus the orbit number. Calls parked in this manner can also be retrieved by dialing the park pickup code (10) plus the station or trunk number. This feature is in addition to Call Park and Page.

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POWER FAILURE TRANSFER

The DCS 400si cabinet can be equipped with the 16 circuit power fail relay transfer unit (DPFT). If power fails, these relays can be used to reroute the C.O. lines on the card to single line telephones. When power is restored to the system, the lines and stations return to normal operation and calls in progress will be disconnected.

PRIME LINE SELECTION

Any station can be programmed to automatically select a specific line, trunk group, telephone number, station or station group when the handset is lifted or the speaker key is pressed (same as Hot Line feature).

PRIVATE LINES

For private line use, stations can be prevented from dialing and/or answering any line.

PROGRAMMABLE LINE PRIVACY

Each outside line can be programmed to ignore the automatic line privacy. This allows up to four other parties to join your conversation by simply pressing the line button. This is similar to 1A2 key telephone operation.

PROGRAMMABLE TIMERS

There are over 50 programmable system timers to allow each installation to be customized to best fit the end user's application.

RECALLS

Calls put on hold, transferred or camped-on to any station will recall to the originating station if not answered within a programmable time. A recall that goes unanswered for the duration of the attendant recall timer will recall to the system operator group. Hold, transfer, camp-on and attendant recalls have individual programmable timers. Calls recalling to buttons with tri-colored LEDs will flash amber.

REMOTE PROGRAMMING—PC

Remote programming allows the technician to access the system database from a remote location for the purpose of making changes to the customer data. Customer-provided modems and a PC using an optional software package will be needed to implement this feature.

RING MODES

TIME BASED ROUTING – PLANS

Each C.O. line can be programmed to ring at any station or station group. Each line can be assigned a ring destination based on six (6) different ring plans based on time of day and the day of the week.

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AUTOMATIC / MANUAL

Ring destinations will automatically change based on time of day and day of week. At any time the system can be manually forced into a specific ring plan. It will remain in this ring plan until manually taken out.

HOLIDAY SCHEDULE

The system has a table of 20 dates that are used to define holidays. On a date designed as a holiday the system will remain in a ring plan for that calendar day providing the system was already in night service. This feature will override the ring plan time table.

TEMPORARY OVERRIDE

At any time the system can be forced into a specific ring plan for a temporary period of time until the next scheduled rin plan automatically takes effect.

RING OVER PAGE

Any outside line can be programmed to ring over a customer-provided paging system. Outside lines, door phones and station groups may ring over page in the day or night mode.

SINGLE LINE CONNECTIONS

Single line ports allow connection of a variety of single line telephones plus facsimile machines, answering machines, loud bells, computer modems, cordless phones and credit card machines. When connecting customer-provided equipment to these extensions, compatibility should be checked out before purchase to ensure correct operation. Central office ring cadence can be selected for SLT stations. This is helpful when optional devices cannot detect DCS 400si intercom ring cadence.

SPEED DIAL NUMBERS (2500)

A library of 2500 speed dial numbers may be allocated as needed. The system list can have up to 500 numbers and each station can have up to 50 numbers. Speed dial numbers are assigned in blocks of ten. Each speed dial number may contain up to 24 digits.

SPEED DIAL BY DIRECTORY

The 400si system provides the user with the ability to look up a speed dial number and place the call. There are three speed dial selections: personal, system and station. This feature requires a display keyset.

STATION HUNT GROUPS (50)

System programming allows up to 50 station hunt groups. One of three ring patterns—sequential, distributed and unconditional—is available for each group. Each unconditional group may contain a maximum of 32 stations and each sequential and distributed group may contain a maximum of 48 stations. A station may be

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assigned to more than one group. The default directory numbers to call these groups are 501–549 and default four digit directory numbers are 5001–5049 Group 500 is reserved for the operator group and is called by dialing “0.” Each station group has its own recall timer for calls transferred to that group.

STATION MESSAGE DETAIL RECORDING (SMDR)

The system provides, via an optional SIM, records of calls made, received and transferred. Connecting a customer-provided printer or call accounting system will allow collection of these records. Each call record provides the following details: station number, outside line number, start date, start time, duration of call, digits dialed (maximum 18) and an account code if entered. The system may print a header followed by 50 call records per page or send continuous records with no header for use with a call accounting machine. See the sample printouts.

The SMDR format contains many options that allow it to be customized for a company’s individual needs. Options to print include incoming calls, outgoing calls, in and out of group status, change in DND status and authorization codes.

STATION PAIR

This feature allows station to be assigned as a “pair”. That is to say a primary and secondary. Calling the primary station will make both stations ring. Selected features such as Message Notification, DND, Callback, and Class of Service act as one station. This is convenient when an individual has two offices or an office extension and a cordless extension.

NOTE: Not all system features are applicable to station pairs. Features designed for a single user may conflict with paired stations.

STATION TO STATION RESTRICTION

This feature restricts any station from calling any other station. It is useful when two or more companies share the same 400si system but want one operator and maybe one boss/owner. Not the same as Tenant Service.

SYSTEM ALARMS

The 400si provides two special alarms, SYSTEM and DISA.

The common control card (DCCP) has an alarm sensor pair. When this pair is short-circuited, the system will ring a preprogrammed destination with a customized SYSTEM alarm message (16 characters maximum). The alarm destination can be any station or station group.

A DISA alarm will warn the customer if the DISA security system has been triggered by too many incorrect password attempts. The alarm can ring any station or station group and show an appropriate display (16 characters maximum) at the assigned stations.

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SYSTEM MAINTENANCE ALARMS

The 400si continuosly performs internal system diagnostics. When either a major or minor fault is detected the system can ring stations with an ALARM KEY assigned. The keyset display shows information that includes the description, location and date and time stamp for each alarm.

A log of 100 alarms are stored in a buffer and can be reviewed at a display keyset or sent to a printer (see sample Alarm Report in section 4.11 of this document). In addition to the keyset displays LEDs, the front of the DCCU card will light to indicate a major or minor alarm.

SYSTEM DIRECTORY

Each station, station group and outside line can have an 11 character directory name. This name will appear on keyset displays to provide additional information about lines and stations.

TENANT SERVICE (2)

There are several programs that allow the DCS 400si to be installed in tenant applications. These features allow a technician to split the system in two with each tenant having individual control over operator groups, page zones, ring modes (manual or automatic), DISA and customer level programming. Each tenant is separate. No intercom calling between tenants is permitted.

TOLL RESTRICTION

There are 500 allow and 500 deny entries of 11 digits each. Each of these entries can apply to dialing classes B, C, D, E, F and G. Expensive 976, 1-900, 411 and operator-assisted calls, as well as specific area and office codes, can be allowed or denied on a per-class basis. Class A stations have no dialing restrictions and Class H stations cannot make outside calls.

Any outside line may be programmed to follow station toll restriction or follow the toll restriction class assigned to it. Each station and trunk can have a day dialing class and a night dialing class.

SPECIAL CODE TABLE

A Special Code Table of ten entries (four digits each) allows use of telephone company features such as CID blocking (✱67) or call waiting disable (✱70) without interference to toll restriction or LCR. The Special Code table allows use of these custom calling features on a per call basis.

TOLL RESTRICTION OVERRIDE

Program options allow system speed dial numbers to follow or bypass a station's toll restriction class. In addition, users may make calls from a toll restricted station by using the walking class of service or authorization code feature.

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TONE OR PULSE DIALING

Outside lines can be programmed for either tone or pulse dialing to meet local telephone company requirements.

TRAFFIC REPORTING

The DCS 400si system can store peg counts for various types of calls. These peg counts can be printed on-demand, daily at 23:59 p.m., or weekly on Saturday at 23:59 p.m. The report includes statistics for each trunk, trunk group, station, station groups and page announcements. For more details and explanations see sections 4.9 and 4.10 of this document.

TRANSFER

System operation permits station users to transfer calls to other stations in the system. Transfers can be screened, unscreened or camped-on to a busy station.

TRUNK GROUPS (49)

Outside lines can be grouped for easy access by dialing a code or pressing a button. There are 49 trunk groups available. Default access codes are 9 and 801–848.

UNIFORM CALL DISTRIBUTION (UCD)

UCD is used whenever the user expects to have more ringing calls than people to answer them. It prevents callers from receiving busy signals or lengthy delays before answering. Callers reaching a busy station group are held in queue for an available agent. First and second announcements reassure the caller until an agent becomes free. Up to twenty separate UCD groups can be created. Programmable automatic logout removes a station from the group if a call is placed to an unattended station, thus preventing unanswered calls. A wrap-up timer prevents calls to a station for a programmable period of time to allow the agent to finish up work associated with the call.

NOTE: Requires optional hardware. Ask your dealer for details.

MAXIMUM OF TWENTY (20) GROUPS

The UCD group option allows callers in queue at a UCD group to be temporarily diverted to an announcement device and then placed back in the queue. A wrap-up timer will allow agents to complete paperwork before receiving the next UCD call.

CALL STATISTICS

UCD supervisor positions using a display keyset can monitor the number of calls in queue, the time that the oldest caller has been waiting, the total number of calls received for the current day and the average time a caller waits to be answered.

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AGENT STATISTICS

UCD supervisor positions using a display keyset can monitor the number of agents in a group and how many agents are currently logged in. Each station's status can be reviewed for the number of calls answered and the average call length of the current day.

GROUP SUPERVISORS

Multiple supervisors can be assigned to each group or one station can be given supervisor status for multiple groups. The group supervisor (using a display keyset) can add and delete agents in real time from the group to handle the workload.

PRINTED REPORTS

Agent supervisors may run printed reports to a customer-provided printer, showing the data available on the supervisor displays.

UNIVERSAL ANSWER

Station users may dial the Universal Answer code or press the UA key to answer any outside lines programmed to ring the UA device. The UA device can be a station, group of stations, common bell or ring over page.

VOICE MAIL INTEGRATION

The 400si system uses DTMF tones (inband signaling) to communicate with any compatible voice mail system. Stations can call forward to a voice mail system. When answered, the system will send DTMF tones routing the caller directly to the called station user's mailbox. Keyset users can press one button to retrieve messages from the voice mail system. A Voice Mail Transfer key permits keyset users to easily transfer a caller directly to an individual voice mailbox without navigating through menus.

NOTE: Although most voice mail systems will work with the DCS 400si, the system data has default values set to work with the Starmail Voice Processing System. They may need to be changed if you are using another system.

WALKING CLASS OF SERVICE

This feature allows users to make calls or use features from a station that is restricted. The users may either use the WCOS feature code or the authorization code feature. Both methods change the class of service to correspond with the station passcode or authorization code that is dialed. After the call is completed, the station returns to its programmed class of service.

STATION FEATURES

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4.2 STATION FEATURE DESCRIPTIONS

ADD-ON MODULES

32 AOM

The 32 button add-on module (AOM) adds to the capability of any keyset. The 32 programmable buttons with red buttons can be used for feature keys, DSS/BLF keys or one touch speed dial buttons. Because this AOM has a microphone and a speaker it can be used to provide executive off hook voice announce or as a stand alone unit whenever a handset and dial pad are not required.

64 BUTTON MODULE

The 64 button module adds to the capability of any keyset. Up to four 64 button modules can be added to each keyset. The 64 programmable red LED buttons with red LED can be used for feature keys, DSS/BLF keys or one touch speed dial buttons. A maximum of 32 can be installed in the 400si system.

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APPOINTMENT REMINDER

Keysets with an alarm key can be used like an alarm clock. When programmed for a specific time, the keyset will sound a distinctive ring to remind the user of meetings or appointments. Alarms can be set for “today only” or for every day at the same time. Up to three alarms may be set at each keyset. Display keysets can also show a programmed message when the alarm rings.

AUTOMATIC HOLD

Station users can enable or disable automatic hold at their keysets. While a user is engaged on an outside (C.O.) call, pressing another trunk key, route key or CALL button automatically puts the call on hold when this feature is enabled. Pressing TRSF, CONFERENCE, PAGE or a DSS key will always automatically place the call on hold. This type of automatic hold is not a user-selectable option.

AUTOMATIC PRIVACY

All conversations on outside lines and intercom calls are automatically private. The privacy feature can be turned off on a per-line basis.

BACKGROUND MUSIC

When customer-provided music sources are connected, each keyset user may listen to background music. The HOLD button turns background music on or off and the volume is controlled by the volume control keys. The number of music sources is dependent on the number of Trunk A and Trunk A1 cards installed in the system. Chime music is available from the Trunk A1 card.

BUSY STATION CALLBACK

When reaching a busy station, callers may request a callback by pressing one button or dialing a code. The system rings the caller back when that station becomes idle (a system-wide maximum of 100 callbacks are allowed at one time including busy station and busy trunk).

BUSY STATION INDICATIONS (BLF)

DSS/BLF keys may be assigned to any keyset or add-on module. These buttons will be off when the station is idle, light red when that station is in use and flash distinctively when that station is in the DND mode.

CALL FORWARDING

Station users can forward internal and outside calls to other destinations immediately (Forward All), when busy (Forward Busy) or if not answered in a programmable number of seconds (Forward No Answer). These forward destinations can all be different. Once a destination has been programmed, it can be turned on and off with a programmable key. Forward All takes priority over Busy and No Answer conditions.

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In addition to the three usual methods of forwarding described above, a fourth option called Follow Me is available. This option allows a station user to set a Forward All condition from his/her station to another station while at the remote station. To display the Follow Me condition, the TRSF key lights steady red at the station that is forwarded. The TRSF key also lights if Forward All is set and no key is programmed for Forward All.

Keyset users can be given an external call forward button to forward their calls to an external phone number. Each outside line may be programmed to either follow or ignore station call forwarding. A per-station option controls whether internal calls forward to voice mail or not. Single line telephones must have the system administrator program this feature for them.

CALL LOG

With the call log feature, a display keyset user can review the last five (5) external telephone numbers that were dialed. The numbers can be viewed and/or dialed using the associated soft keys.

CALL PICKUP

With directed call pickup, a user can answer calls ringing at any station by dialing a code plus that extension number. The group pickup feature allows the user to answer any call ringing within a pickup group. Pickup keys may be customized with extenders to allow pickup from a specific station or pickup group. The DCS 400si has 20 programmable pickup groups.

DIRECT STATION SELECTION (DSS)

Programmable keys can be assigned as DSS keys and associated with extension numbers. Users press these keys to call or transfer calls to the assigned stations.

DO NOT DISTURB (PROGRAMMABLE)

The Do Not Disturb (DND) feature is used to stop all calls to a station. System programming can allow or deny use of the DND feature for each station. Parties calling a station in DND will receive reorder tone. When in DND mode, calls may be forwarded to another destination. See Forward DND option. A keyset without a DND button can activate DND via the feature access code. The ANS/RLS key will flash at 112 ipm (rapidly) when DND is set. There is a programmable option to allow a C.O. line to override DND at its ring destination if that destination is a single station.

DOOR LOCK RELEASE

Stations programmed to receive calls from a door phone can dial a code to activate a contact closure for control of a customer-provided electronic door lock.

EXCLUSIVE HOLD

Pressing HOLD twice will hold a call exclusively at a station so no other station can pick up that call. Intercom calls are automatically placed on exclusive hold.

GROUP LISTENING

This feature allows users to turn on the speaker while using the handset. It allows a group of people to listen to the distant party over the speaker without the microphone turned on.

HEADSET OPERATION

Every keyset can be programmed to allow the use of a headset. In the headset mode, the hookswitch is disabled and the ANS/RLS key is used to answer and release calls. Keyset users may turn headset operation ON/OFF by keyset programming or more easily by pressing the headset ON/OFF key. The headset key lights steady red when the keyset is in headset mode. The ANS/RLS key lights if headset mode is activated by keyset programming only.

HEARING AID COMPATIBLE

All DCS 400si keysets are hearing aid compatible as required by Part 68 of the FCC requirements.

LINE QUEUING WITH CALLBACK

When the desired outside line is busy, the user can press the CALLBACK key or dial the access code to place his/her station in a queue. The user will be called back when the line is available (a maximum of 100 callbacks are allowed system-wide at one time including busy station and busy trunk).

LINE SKIPPING

When the user is talking on an outside line and the automatic hold feature is turned off, he/she may press an idle line key and skip to that line without causing the previous call to go on hold.

LOUD RINGING INTERFACE

The DCCP has 2 relays and the DMAP1 has 4 relays that can be programmed to provide a dry contact closure for control of a customer provided loud ringing device. Any of these relays can be programmed to operate with a specific station or station group.

MANUAL SIGNALLING

Keysets can signal each other via a programmable key. This allows one station to alert another without establishing a voice conversation. Each press of the key results in a 500 milliseconds of ring tone being sent to the intended station. An individual manual signalling key must be programmed for each station to be signalled.

MESSAGE WAITING LIGHT/INDICATION

When a message indication is left at a keyset, the MESSAGE button will slowly flash red. Single line telephones will receive a distinctive dial tone to notify them that a message is waiting. Message waiting indications can be left for any station or group of stations.

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MUTE MICROPHONE/HANDSET

Any keyset user can mute the keyset's handset transmitter by pressing the MUTE key. In addition, keyset users can also mute the keyset microphone while the keyset is in speakerphone mode.

OFF-HOOK RINGING

When a keyset is in use, the system will provide an off-hook ring signal to indicate that another call is waiting. The ring signal is a single ring repeated. The interval is controlled by a system-wide timer. Single line stations will receive a tone burst through the handset receiver instead of a ring.

OFF-HOOK VOICE ANNOUNCE (STANDARD)

Keysets may receive a voice announcement while on another call. The calling station must have an OHVA key. When transferring a call to a busy keyset or while listening to busy signal, the station user can press the OHVA key to make an OHVA call to the busy keyset. If the called keyset is in the DND mode, it cannot receive OHVA calls.

OFF-HOOK VOICE ANNOUNCE (EXECUTIVE)

A keyset associated with an add-on module (AOM) may receive an executive off-hook voice announcement while on another call. The called keyset user may reply handsfree without interrupting the call in progress. Only keysets with an off-hook voice announce button (OHVA) can off-hook voice announce to keysets with AOMs.

ONE TIME DO NOT DISTURB

The Do Not Disturb (One Time) feature is used to stop all calls to a station when the user is on an outside line and does not want to be disturbed for the duration of the call. Upon completion of the call, DND is canceled and the station is returned to normal service. This feature requires a programmed button.

ONE TOUCH DIALING KEYS

Frequently used speed numbers can be assigned to one touch dialing keys for fast accurate dialing.

ON-HOOK DIALING

Any keyset user can originate calls without lifting the handset. When the called party answers, the user may speak into the microphone or lift the handset for more privacy.

PRIVACY RELEASE

This feature will allow another station to join in on your conversation by temporarily releasing privacy on the C.O. line from your keyset.

Requires a Privacy Release key to be programmed on your keyset. A maximum of three (3) other people can join in. This uses one of the conference circuits in the system.

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PROGRAMMABLE KEYS

LCD 24B and STD 24B keysets have 24 programmable keys and LCD 12B and Basic 12B keysets have 12. Each key can be programmed for more than 25 different uses to personalize each phone. Examples of keys include individual outside line, individual station, group of lines, group of stations and one touch speed dial buttons. Using these keys eliminates dialing access codes.

The following feature keys have extenders that make them more specific: SPEED DIAL, SUPERVISOR, PAGE, DSS, DIRECTED PICKUP, GROUP PICKUP, DOOR PHONE, BOSS, PROGRAMMED MESSAGE, IN AND OUT OF GROUP, FORWARD and VOICE MAIL TRANSFER. The extender can be a station, a group or another identifying number.

PROGRAMMED STATION MESSAGES

Any station may select one of thirty (30) messages to be displayed at a calling party's keyset. Ten messages are factory-programmed. Two can be individually customized, i.e., RETURN ON:MAR/22 and RETURN AT 3:30p., the remaining eighteen can be customized by the system administrator (16 characters maximum).

NOTE: The calling party must have a display keyset to view these messages.

PROTECTION FROM BARGE-IN

Each station can be programmed as secure or not secure. Secure stations cannot be barged-in on. A station that is not secure cannot be barged-in on when talking to a secure station.

PULLOUT DIRECTORY TRAY

A pullout directory tray is conveniently located beneath all keysets. It is used to record station directory names and speed dial numbers.

PULSE TO TONE SWITCHOVER

When dialing a number on a dial pulse network, a station user can dial # and the DCS 400si system will begin to send DTMF.

REDIAL

There are five types of external redial available to station users. Each type can redial up to a maximum of 18 digits.

- AUTO RETRY—When an outside number is dialed and a busy signal is received, the auto retry feature can be used to reserve the outside line and automatically redial the number for a programmable number of attempts (available to keyset users only).
- LAST NUMBER REDIAL—The most recently dialed number on a C.O. line is saved and may be redialed by pressing the redial key or dialing the LNR access code.

- MANUAL RETRY with LNR—When you make an outside call and receive a busy signal you can press the LNR key to redial the same number again. This operation can be manually repeated for a limited number of attempts as defined by system programming (available to keyset users only).
- MEMO REDIAL—When you are calling directory assistance you can store the number you are given using the dial pad and SAVE number feature. There is no need for a pencil and paper (available to keyset users only).
- SAVE NUMBER REDIAL—Any number dialed on a C.O. line may be saved for redial at a later time.

REMOTE HOLD

When you wish to place a call on hold at another station, press TRSF and dial the station number (or press the appropriate DSS key). Press the HOLD key. This will place the call on system hold on an available CALL button or Line Key at the remote station.

RING MODES

Each keyset user can select one of three distinct ways to receive intercom calls. The phone can automatically answer on the speakerphone, voice announce through the speaker or receive ringing. When the ring mode is selected, keyset users can choose one of eight distinct ring tones. Forced Auto Answer is invoked by the calling station and is controlled by the calling station's class of service.

RINGING PREFERENCE

Lifting the handset or pressing the speaker button automatically answers a call ringing at the keyset. Using this method, users are assured of answering the oldest call first. When ringing preference is turned off, the user must press the flashing button to answer. Users may answer ringing lines in any order by pressing the flashing button.

SPEAKERPHONE

LCD 24B, STD 24B, LCD 12B and Basic 12B keysets have a built-in speakerphone. The speakerphone enables calls to be made and received without the use of the handset.

STATION LOCK

With a programmable personal station passcode, any keyset or single line station can be locked and unlocked to control use of each telephone. There are two lock options: 1 = LOCKED OUTGOING and 2 = LOCKED ALL CALLS. See the following table for more details.

CONTENTS

	UNLOCKED	1 LOCKED OUTGOING	2 LOCKED ALL CALLS
Make outside calls	YES	NO	NO
Receive outside calls	YES	YES	NO
Make intercom calls	YES	YES	NO
Receive intercom calls	YES	YES	NO

TRI-COLORED LIGHTS

LCD 24B and STD 24B keysets have 16 keys equipped for tri-colored LED indications (green, red and amber). LCD 12B and Basic 12B models have six of these keys and 7B keysets have three. To avoid confusion, your calls always light green, other calls show red, and recalls light amber.

VOLUME SETTINGS

Each keyset user may separately adjust the volume of the ringer, speaker, handset receiver, background music, page announcement and off-hook ring tone.

WALL-MOUNTABLE KEYSETS

Each keyset, add on module and 64 button module can be wall mounted by reversing the base wedge. The newest base wedge may not fit all wall mounting scenarios so in these cases the original wall mount/base wedge unit should be used.

CONTENTS

DISPLAY FEATURES

4.3 DISPLAY FEATURE DESCRIPTIONS

ACCOUNT CODE DISPLAY

Account codes are conveniently displayed for easy confirmation. If entered incorrectly, users may press the ACCOUNT key again and reenter the account code.

CALL DURATION TIMER

The system can automatically time outside calls and show the duration in minutes and seconds. Station users may manually time calls by pressing the TIMER button.

CALL FOR GROUP IDENTIFICATION

When a call is made to a station group, the display shows [CALL FOR GROUP] and the user's group number. These calls can be answered with a different greeting than calls to the user's extension number.

CALL PROCESSING INFORMATION

During everyday call handling, the keyset display will provide information that is helpful and in some cases invaluable. Displays such as [CALL FROM 203], [TRANSFER TO 202], [701: RINGING], [TRANSFER FM 203], [708 busy], [Camp on to 204], [Recall from 204], [Call for 501], [message from 204] and [FWD ALL to 204] keep users informed of what is happening and where they are. In some conditions, the user is prompted to take action and in other cases the user receives directory information.

CALLER ID/ANI INFORMATION

Caller ID/ANI information is dependent on the use of display keysets. The following list explains the displays that are used with Caller ID.

NAME/NUMBER DISPLAY

Each display keyset user can decide if he/she wants to see the Caller ID name or Caller ID/ANI number in the display. Regardless of which one is selected to be seen first, the NND key is pressed to view the other piece of CID information.

CONTENTS

NEXT CALL

In the event that there is a call waiting or a camped-on call at the user's keyset, the user can press the NEXT key to display the Caller ID information associated with the next call in queue at the station. Either the CID name or CID/ANI number will show in the display depending on the N/N selection.

SAVE CID/ANI NUMBER

At any time during an incoming call that provides CID information, the user may press the SAVE key. This saves the CID number in the Save Number feature. Pressing the SAVE number redial key will dial the CID number. The system must be using LCR to dial the saved number.

STORE CID/ANI NUMBER

At any time during an incoming call that provides CID information, the user may press the STORE key. This saves the CID number as a speed dial number in the personal speed dial list. The system must be using LCR to dial the stored number.

INQUIRE PARK/HOLD

When a user is informed that an incoming call is on hold or has been parked, the user may view the Caller ID or ANI information before he/she retrieves the call. This may influence how the user chooses to handle the call.

CID/ANI REVIEW LIST

This feature allows display keyset users to review CID information for calls sent to their stations. This list can be from ten to fifty calls in a first in, first out basis. The list includes calls that were answered and calls that rang the user's station but that were not answered. When reviewing this list, the user can press one button to dial the person back. The system must be using LCR to dial the stored number.

INVESTIGATE

This feature allows selected stations with a special class of service to investigate any call in progress. If CID/ANI information is available for an incoming call, the selected stations can know to whom the 400si user is speaking. On outgoing calls, the selected stations can see who was called. After investigating, the selected stations may barge-in on the conversation, disconnect the call or hang up.

ABANDON CALL LIST (50)

The 400si has a system-wide abandon call list that stores CID/ANI information for the last 50 calls that rang but were not answered. The list is accessed using the operator's passcode. When reviewing this list, the user is provided options to CLEAR the entry or DIAL the number. The user can use the NND key to toggle between the CID/ANI name, CID/ANI number and the date and time the call came in. The system must be using LCR to dial numbers from the abandon call list.

CONTENTS

CALLING PARTY NAME

For intercom calls, LCD 24B and LCD 12B keysets show the calling party's name before answering. The names must be stored in the system directory list and can be up to 11 characters long.

CALLING PARTY NUMBER

When an intercom call is received, all display stations show the calling party's extension number before the call is answered.

CONFERENCE INFORMATION

When a conference is set up, each extension and outside line number is displayed at the controlling station when it is added. When a station is added, its display shows [Conf with xxx] alerting the user that other parties are on the line.

DATE AND TIME DISPLAY

In the idle condition, the current date and time are conveniently displayed. Display keysets can have a 12 or 24 hour clock in either the ORIENTAL or WESTERN display format with information shown in upper case or lower case letters.

DIAL BY NAME

Each station and speed dial number can have an associated directory name. Any station or speed dial number can be selected by scrolling alphabetically through a directory list. There are three directories:

1. System wide speed dial list
2. Personal speed dial list
3. Station directory list

This online "phone book" allows display keyset users to look up and dial any speed dial number or station in seconds.

DIALED NUMBER

When an outside call is made, digits are displayed as the user dials them. If the display indicates an incorrect number was dialed, the user can quickly hang up before billing begins.

ENHANCED STATION PROGRAMMING

Personal programming options are easier to select and confirm with the help of the display.

IDENTIFICATION OF RECALLS

Hold recalls and transfer recalls are identified differently than other ringing calls. Hold recalls indicate the recalling line or station number and the associated name. Transfer recalls indicate the recalling line or station and where it is coming from.

CONTENTS

IDENTIFICATION OF TRANSFERS

The display will identify who transferred a call to the user.

MESSAGE WAITING CALLER NUMBER

When the message indication is on, pressing the MESSAGE button displays the station number(s) of the person(s) who have messages for the user. Display keyset users can scroll up and down to view message indications.

OUTSIDE LINE IDENTIFICATION

Each line can be identified with an 11 character name. Incoming calls display this name before the call is answered. This feature is helpful when individual lines must be answered with different greetings.

OVERRIDE IDENTIFICATION

If another station barges-in on a user's conversation, the display will alert the user with a [Barge from 2xx] display if the system is set for barge-in with tone.

PROGRAMMED MESSAGE DISPLAY

Preprogrammed station messages set by other stations are displayed at the calling station's keyset.

SOFT KEYS

Below the display, there are three soft keys and a SCROLL button. These keys allow the user to access features in his/her class of service without requiring the keyset to have designated feature keys.

STOPWATCH TIMER

Display keyset users find this feature very convenient to time meetings, calls and other functions. Users simply press once to start the timer and press again to stop the timer.

TEXT MESSAGING

This feature allows two display keyset users to respond to each other with preprogrammed messages. After receiving an Off Hook Voice Announcement or Station Camp-On, you may respond with a text message while continuing to talk and listen to your outside party. The other station can view this message and take the appropriate action or respond back with another text message.

There can be 25 messages stored in the system memory that can be sent to another display keyset. Only the display keysets that are allowed in system programming (MMC 318) will receive the TMSG soft key in the display and can use this feature.

CONTENTS

UCD SUPERVISOR DISPLAYS

With the optional AA card, when UCD is used, multiple supervisors can view information about the UCD groups calls or agents.

CALL SCREEN

This allows the supervisor to view how many calls are in queue, the longest wait time, how many calls have been received today, what the average time in queue is and how many calls were abandoned.

AGENT SCREEN

This allows the supervisor to monitor how many agents are logged in, check each agents status (IN GROUP, OUT OF GROUP, or DND), view each agents total number of calls, average call length or average ring time.

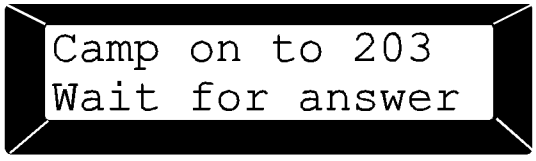
NOTE: Accessing this screen will also allow a Supervisor to change the status of each agent (IN GROUP, OUT OF GROUP, or DND).

CONTENTS

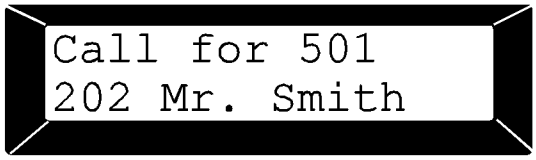
SAMPLE DISPLAYS

PROSTAR LCD 12B and LCD 24B display model keysets have a large, easy-to-read, 32 character liquid crystal display. Helpful call processing information is provided so everyday call handling is quick and easy. Here are just some of the displays you may see.

Idle display shows extension, name, day, date and time.



This station is camped-on to extension 203 and is waiting for 203 to answer.

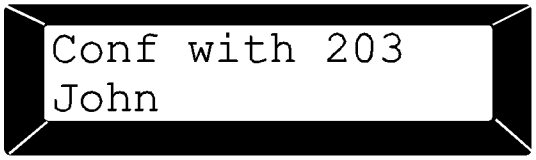


This station in the sales department is receiving a group call from Mr. Smith.

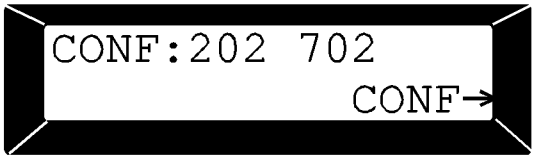
This display tells you this is a new incoming call to the sales department.

This station is calling station 203 which is currently busy.

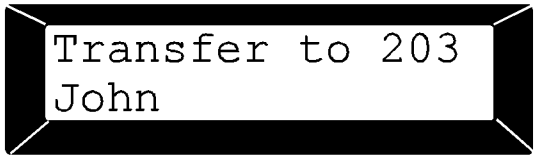
This station is receiving an off-hook voice announcement from station 203.



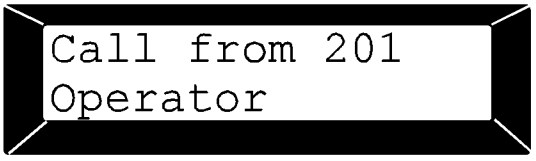
This station is on a conference call with John, extension 203. Assume other parties will hear your conversation.



This station is on a conference call with extension 202 and trunk 702 and has the option to add two more parties.



This station is transferring a call to John at extension 203.



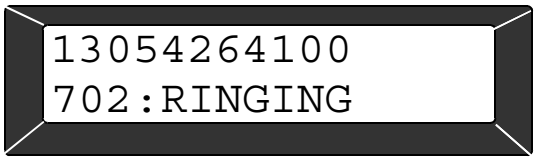
This station is receiving a call from extension 201.

This station is setting the Do Not Disturb feature.

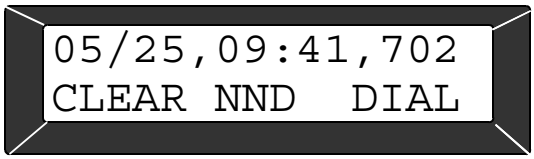
This station is speaking on trunk 703.

SAMPLE CALLER ID DISPLAYS

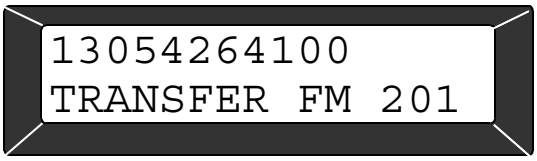
CONTENTS



This display shows an incoming call from 1-305-426-4100 on Line 702 ringing directly at your station.



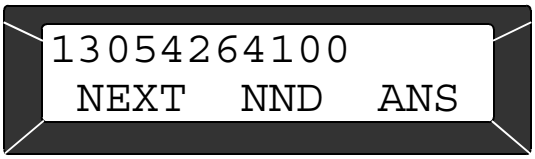
This display shows the information on the abandoned call list. This call came in on May 25 at 9:41 A.M. on line 702. The user can CLEAR the entry, DIAL the caller back or examine further NND information.



This display shows a call from 1-305-426-4100 that has been transferred to you from station 201.

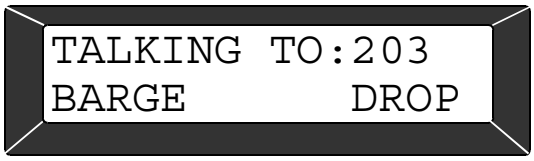
This display shows an entry in a station review list showing the three initial options. The arrow indicates other options available to you by pressing the SCROLL key.

This display shows an investigation of a station that is talking to Samsung Telecom. Investigator can BARGE-in to the conversation, DROP the call from the system or examine further NND information.

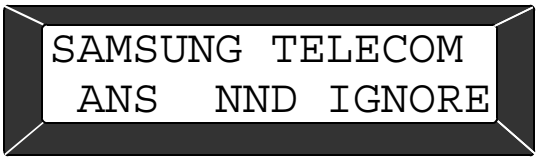


This display is seen while examining calls in queue at your keyset.

This display shows an incoming call from Samsung Telecom ringing at group 500.



This display can be seen when investigating an intercom call. The investigator can BARGE-in or DROP the connection.

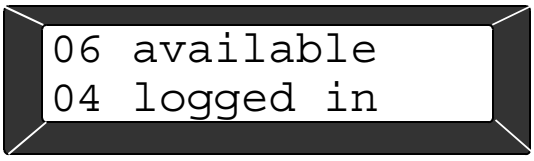


This display is seen while using the INQUIRE feature. It shows the three options available while you are checking on a held or parked call.

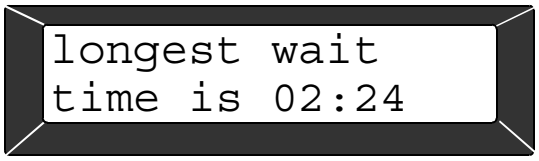
SAMPLE UCD DISPLAYS

CONTENTS

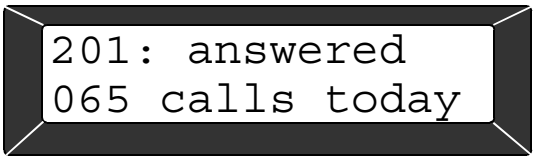
There are five calls currently waiting to be answered by the UCD group.



There are six members in the group. Four of the members are currently logged in.

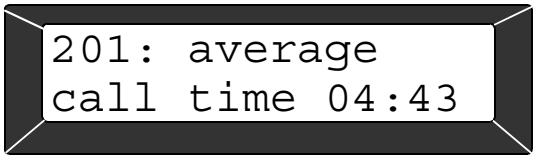


The longest call on hold (waiting to be answered) was for two minutes, 24 seconds. This data applies to all calls since the supervisor data was last cleared. It does not necessarily represent calls currently in queue.

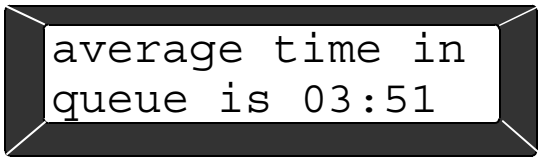


The agent at station 201 has answered 65 calls today.

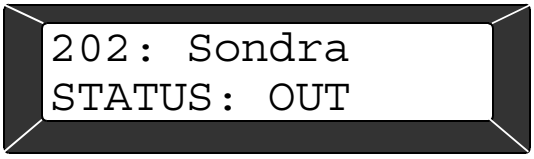
The UCD group has received 124 calls today.



The average call length for station 201 is four minutes and 43 seconds.



The average time on hold (waiting to be answered) is three minutes and 51 seconds.



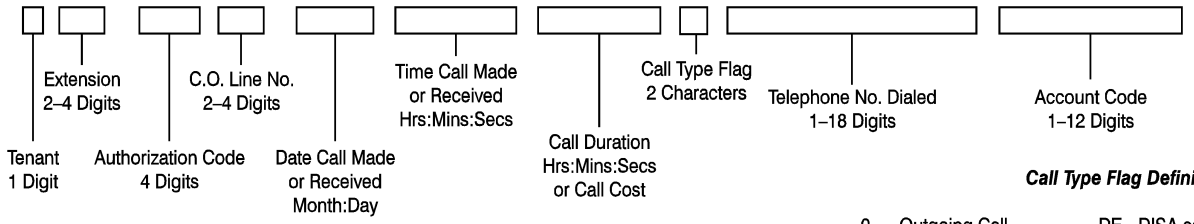
Station 202 is currently out of the group. (The display can also show IN GROUP and DND.)

CONTENTS

4.4 SAMPLE SMDR PRINTOUT (WITHOUT CALLER ID)

```
                    SMDR REPORT FOR [STA Miami    ] Mar/21/1999 13:49

================================================================================
   T EXT   AUTH TRK   MM/DD STT.TIME DURATION FG DIALED DIGIT     ACCOUNT CODE
================================================================================
   1 3951       725   03/21 13:51:17 00:00:08 IA
   1 3951       725   03/21 13:51:25 00:00:14 IT
   1 217        744   03/21 13:51:29 00:00:14 IA
   1 235        725   03/21 13:51:39 00:00:06 T
   1 219        726   03/21 13:51:25 $  10.75 O  3056401067      *1234567890#
   1 217        744   03/21 13:51:43 00:00:40 I
   1 278        725   03/21 13:53:40 00:00:07 O  18007864782
   1 3951       726   03/21 13:54:45 00:00:07 IA
   1 219              03/21 13:55:03             GROUP OUT
   1 3951       726   03/21 13:54:52 00:00:30 IT
   1 217        726   03/21 13:55:22 00:00:16 TT
   1 235              03/21 13:55:30             DND ON
   1 218        726   03/21 13:55:38 00:00:33 TT
   1 235              03/21 13:57:50             DND OFF
   1 279  6398 727   03/21 13:57:32 $  13.25 O  3056401066
   1 219              03/21 14:00:45             GROUP IN
   1 219        726   03/21 13:56:11 00:05:38 T
   1 296        725   03/21 13:54:40 00:07:06 O  3055922900217
   1 219        717   03/21 14:03:57 00:00:15 O  19544530000       *1234567890#
```

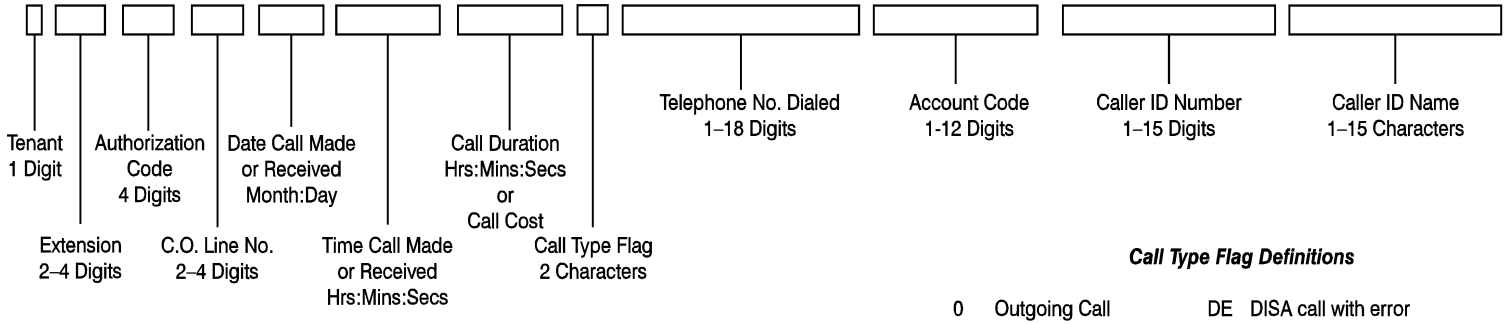


Call Type Flag Definitions

0	Outgoing Call	DE	DISA call with error
I	Incoming Call	T	Transferred call that was terminated
DI	DISA call in	IT	Incoming transfer
DO	DISA call out	FI	Incoming call forwarded to an external number
FO	Outgoing record of forwarded call	OT	Outgoing transfer - Outgoing call made and transferred
IA	Incoming Ring Time Before Being Answered	TT	Caller received a transferred call and transferred it again

SMDR REPORT FOR [STA Miami] Mar/21/99 13:49

T	EXT	AUTH	TRK	MM/DD	STT.TIME	DURATION	FG	DIALED DIGIT	ACCOUNT CODE	CID/ANI NUMBER	CID/ANI NAME
1	3951		725	03/21	13:51:17	00:00:08	IA				
1	3951		725	03/21	13:51:25	00:00:14	IT			13055922900	SAMSUNG TELECOM
1	217		744	03/21	13:51:29	00:00:14	IA				
1	235		725	03/21	13:51:39	00:00:06	T			13055922900	SAMSUNG TELECOM
1	219		726	03/21	13:51:25	$ 10.75	O	3056401067	*1234567890#		
1	217		744	03/21	13:51:43	00:00:40	I			13055559748	PIZZA DELIVERY
1	278		725	03/21	13:53:40	00:00:07	O	18007864782			
1	3951		726	03/21	13:54:45	00:00:07	IA				
1	219			03/21	13:55:03			GROUP OUT			
1	3951		726	03/21	13:54:52	00:00:30	IT			13055922900	SAMSUNG TELECOM
1	217		726	03/21	13:55:22	00:00:16	TT			13055922900	SAMSUNG TELECOM
1	235			03/21	13:55:30			DND ON			
1	218		726	03/21	13:55:38	00:00:33	TT			13055556420	PIZZA DELIVERY
1	235			03/21	13:57:50			DND OFF			
1	279	6398	701	03/21	13:57:32	$ 13.25	O	3056401066			
1	219			03/21	14:00:45			GROUP IN			
1	219		726	03/21	13:56:11	00:05:38	T			13055922900	SAMSUNG TELECOM
1	296		725	03/21	13:54:40	00:07:06	O	3055922900217			
1	219		717	03/21	14:03:57	00:00:15	O	19544530000	*1234567890#		



4.5 SAMPLE SMDR PRINTOUT (WITH CALLER ID AND CALL COST)

Call Type Flag Definitions

0	Outgoing Call	DE	DISA call with error
I	Incoming Call	T	Transferred call that was terminated
DI	DISA call in		
DO	DISA call out	IT	Incoming transfer
FO	Outgoing record of forwarded call	FI	Incoming call forwarded to an external number
A	Abandoned call	OT	Outgoing transfer - Outgoing call made and transferred
IA	Incoming Ring Time Before Being Answered	TT	Caller received a transferred call and transferred it again

CONTENTS

4.6 SAMPLE UCD REPORT

```
=========================================================
UCD GROUP 530 : SALES

FROM: SUN 02 Feb 00:00
TO  : SUN 02 Feb 02:54

CALL STATISTICS
===============
AVERAGE RING TIME (TIME TO ANSWER).....00:40
NUMBER OF TIMES ALL AGENTS BUSY........00002
AVERAGE TIME IN QUEUE..................00:51
TOTAL CALLS RECEIVED...................00011
LONGEST QUEUE TIME(TODAY)..............02:14
TOTAL CALLS ABANDONED..................00004

AGENT STATISTICS
================
MEMBER  AGENT  NAME          CALLS       AVERAGE     RING
                            ANSWERED    CALL TIME    TIME
---------------------------------------------------------
01      210    JOHN          0002        01:55       00:05
02      211    SAM           0001        02:18       00:06
03      208    MIKE          0003        01:22       00:04
04      207    PETER         0001        03:16       00:05


=========================================================
UCD GROUP 531 : SUPPORT

FROM: MON 03 Jan 08:30
TO  : SUN 02 Jan 02:54

CALL STATISTICS
===============
AVERAGE RING TIME (TIME TO ANSWER).....00:07
NUMBER OF TIMES ALL AGENTS BUSY........00005
AVERAGE TIME IN QUEUE..................01:06
TOTAL CALLS RECEIVED...................00023
LONGEST QUEUE TIME(TODAY)..............01:02
TOTAL CALLS ABANDONED..................00001

AGENT STATISTICS
================
MEMBER  AGENT  NAME          CALLS       AVERAGE    RING
                            ANSWERED    CALL TIME   TIME
---------------------------------------------------------
01      223    FRED          0012        02:33      00:08
02      213    JANE          0010        01:04      00:04
```

4.7 UCD CALL STATISTICS OVERVIEW

CONTENTS

The UCD feature provides various statistics regarding incoming calls to each UCD group. A UCD supervisor may scroll through the statistics at any time using the keyset display and softkeys. Additionally these statistics can be printed in a report for each UCD group (see Sample UCD Report Section 4.6). This overview explains how they are calculated and conditions that affect them. NOTE: Some statistics are not included in the UCD report.

CALLS IN QUEUE NOW

This is the number of calls in the UCD queue as of the time the supervisor is reading the display. Because this statistic is real time statistic it will not print on a report.

ABANDONED CALLS (TODAY)

This shows the number of callers that reached the UCD group, but hung up before being answered. A high number probably means that there are not enough agents available and the wait time is too long.

AVERAGE RING TIME

This is calculated from the time an agent begins to ring until the time an agent answers the call, this does not include ringing at an agent station that does not answer or is logged out because of the ring next option.

NUMBER OF TIMES ALL AGENTS BUSY

This is the number of times that a call is placed to an UCD group and all agents are busy or out of group. This check is made when the call is first placed to the group.

Example: If there are 5 members in a group, 3 are Out of Group one is busy and one is idle, and a call is placed to the group, because there is an idle station the all agents busy counter is not incremented.

If the idle station rings, does not answer and is logged out, although the condition of the group is now all agents busy, the check has been made and the agent busy statistic does not increment.

Also if a call comes into a group with all agents busy and then one becomes idle, the busy counter will increment because the check has been made.

AVERAGE TIME IN QUEUE

This is calculated as an average of all the calls that were in queue.

Note that this is ONLY an average of the calls that were in queue. The caller must have overflowed to the UCD recording to be considered in queue.

A call is considered in queue until it is answered or until it goes to the final destination.

CONTENTS

TOTAL CALLS RECEIVED (TODAY)

The total number of times that calls were sent to a group. This includes calls that were answered by the group, calls that went to a group with all agents busy or out of group, calls that are abandoned and calls that go to UCD final destination. This includes intercom calls to the UCD group.

If this number is less than the total calls received by all the agents it is possible that calls were transferred from one agent to another.

If this number is more than the total calls received by all the agents it is possible that calls were unanswered by an agent and went to final destination or callers hung up while in queue.

This statistic includes:

a) Calls answered by agent.
b) Calls that are not answered by an agent and go to final destination.
c) Calls that are sent to the UCD group but callers hang up before being answered.

LONGEST QUEUE TIME (TODAY)

This shows the longest call in queue today. The queue time is calculated as follows:

a) Queue time begins when a caller starts to hear the first UCD message.
b) Queue time ends when a caller is either

- Answered by an agent
- System gets disconnected from C.O. or
- Caller is transferred to final destination

LONGEST QUEUE TIME NOW

This shows the longest call currently in queue. The queue time is calculated as follows:

a) Queue time begins when a caller starts to hear the first UCD message.
b) Queue time ends when a caller is either

- Answered by an agent
- System gets disconnected from C.O. or
- Caller is transferred to final destination

4.8 UCD AGENT STATISTICS OVERVIEW

CONTENTS

The UCD feature provides various statistics regarding agent activity for each UCD group. A UCD supervisor may scroll through the statistics at any time using the keyset display and softkeys. Additionally these statistics can be printed in a report for each UCD group (see Sample UCD Report Section 4.6). This overview explains how they are calculated and conditions that affect them. NOTE: Some statistics are not included in the UCD report.

LOGGED IN

The supervisor's display will show the number of stations assigned to the UCD group and the number of stations that are currently logged in. Because this statistic is a real time statistic it will not print on a report.

STATUS

This screen shows the agents name, extension number and status. The status can be In Group, Out of group or in DND. Because this statistic is a real time statistic it will not print on a report.

CALLS ANSWERED (TODAY)

This indicates the total number of calls answered by the agent. This does not include ring no answer to an agent station.

If this total number is less than the calls received by the group it is possible that calls were not answered by an agent and therefore went to final destination or that callers hung up while in queue.

If this total number is more than the calls received by the group it is possible that calls were transferred from one agent to another.

AVERAGE CALL TIME

This is an average of all the call durations for a specific agent

AVERAGE RING TIME

This is an average of all the ring times for a specific agent. Ring time is explained in Call Statistics.

4.9 SAMPLE TRAFFIC REPORT

CONTENTS

```
            TRAFFIC REPORT FOR [  STA Miami       ] Mar/21/1999 13:35
**************************** SYSTEM STATISTICS ********************************

BEGINNING:  Mar/15/1999  00:42                        ENDING:  Mar/21/1999 13:32

     ACTIVITY                                         SYSTEM TOTAL

     INCOMING TRUNK CALLS - ANSWERED.................    3041
     INCOMING TRUNK CALLS - NOT ANSWERED.............      26
     OUTGOING TRUNK CALLS ...........................    2168
     A SELECTED TRUNK WAS BUSY.......................      44

     INTERCOM CALLS - COMPLETED......................    7178
     INTERCOM CALLS - NOT ANSWERED...................    1540

     TRUNK RECALLS TO STATION........................     145
     TRUNK RECALLS TO OPERATOR GROUP.................      32

     INTERNAL PAGE USED..............................      35
     EXTERNAL PAGE USED..............................      79
     ALL PAGE USED...................................     231

***************************** TRUNK GROUPS **********************************

 GROUP     OUTGOING  BUSY
  9           1245     18
  800          521      3
  801           20      3
  802            0      0
************************** INDIVIDUAL TRUNKS ********************************

TRUNK     TRUNK-NAME    ATTA     ANSD     NOT-ANSD     OUTGOING    BUSY
  701     LOCAL 1          0      737        0            19        12
  702     LOCAL 2          0      541        4            26        11
  703     LOCAL 3          0      290        1            37        21
   .
   .
   .
```

continued to trunk #768

```
************************** STATION HUNT GROUPS ******************************

          <————————— OUTSIDE CALL —————————>                    <-INTERCOM->
GROUP    ANSD    NOT-ANSD                                          ANSD
  500     439      19                                               61
  501     261      37                                               38
  502      40       2                                               77
  503      87       5                                              162
  504      19       1                                               44

*********************** INDIVIDUAL STATIONS *********************************

                  <———— OUTSIDE CALL ————————————————————————><-INTERCOM—->
EXT  STATION-NAME ATTA ANSD NOT-ANSD DIALED ICM-TRSF TRK-TRK PICKUP   ANSD DIALED
201  Operator        9  360     11      15      341       0      0     39     72
202  Barbara        12   60      2      80       20       0     12     49     66
203  Ivania          4   25      1      36        3       0     18     86     29
   .
   .
   .
```

continued to station 346

4.10 TRAFFIC REPORT OVERVIEW

CONTENTS

```
A************************** SYSTEM STATISTICS **************************

1 BEGINNING:  04/01/99  08:00                    ENDING:  04/01/99 17:30

2 ACTIVITY                                      SYSTEM TOTAL

  3 INCOMING TRUNK CALLS - ANSWERED.................0000
  4 INCOMING TRUNK CALLS - NOT ANSWERED.............0000
  5 OUTGOING TRUNK CALLS ...........................0000
  6 A SELECTED TRUNK WAS BUSY.......................0000

  7 INTERCOM CALLS - COMPLETED......................0000
  8 INTERCOM CALLS - NOT ANSWERED...................0000

  9 TRUNK RECALLS TO STATION........................0000
 10 TRUNK RECALLS TO OPERATOR GROUP.................0000

 11 INTERNAL PAGE USED.............................0000
 12 EXTERNAL PAGE USED.............................0000
 13 ALL PAGE USED..................................0000
```

1. **BEGINNING & ENDING**
   This identifies when the statistics were collected. It includes dates and time.

2. **ACTIVITY:** Overall summary of traffic in the system for activities 3 to 13.

3. **INCOMMING TRUNK CALLS-ANSWERED:** These are any incoming trunk calls to the system. These calls are pegged when answered by any device and/or station in the system whether it is a new call or a recall.

4. **INCOMING TRUNK CALLS-NOT ANSWERED:** These are any incoming trunk calls that were not answered by any station or device in the systems. These are the same calls that would be flagged as abandoned in SMDR.

5. **OUTGOING TRUNK CALLS:** These are all outgoing trunk calls that were originated by any station or through the DISA feature. Outgoing trunk calls are valid calls as defined by the SMDR START TIME in MMC 501.

6. **A SELECTED TRUNK WAS BUSY:** Pegged every time a trunk or trunk group was busy regardless of the manner in which it was selected (e.g., DTS key, LCR, “9”, 7XX, TRK GROUP SELECT, SPD, External call forward, DISA).

7. **INTERCOM CALLS COMPLETED:** These are all intercom calls that were completed to any station, station group or device.

CONTENTS

8. **INTERCOM CALLS NOT COMPLETED:** These are all intercom calls that were not answered and resulted in the calling party hanging up. A call to a station group that overflows to another station is considered not answered whether the overflow destination did or did not answer.

9. **TRUNK RECALLS TO STATION:** These are trunk calls that were placed on any kind of hold and recalled a station. These are also trunk calls that were transferred and were not answered and recalled the transferring station. This includes members of the operator group that put calls on hold and then recall the operators station.

10. **TRUNK RECALLS TO OPERATOR GROUP:** These are any trunk calls that recalled to the operator group.

11. **INTERNAL PAGE USED:** Peg count of every time internal page was accessed.

12. **EXTERNAL PAGE USED:** Peg count for every time external page was accessed.

13. **ALL PAGE USED:** Peg count of every time the all page feature was accessed. This does not include internal or external page, only 55+✱ or PAGE ✱.

B✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱ TRUNK GROUPS ✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱

1 GROUP	**2** OUTGOING	**3** BUSY
9	0000	0000
800	0000	0000
801	0000	0000

1. **GROUP:** A listing of all trunk groups assigned in the system.

2. **OUTGOING:** These are the number of outgoing trunk calls made using each trunk group. Pegged every time a member of this trunk group was used to make a valid outgoing call. A valid outgoing call is defined by the SMDR Start Time programmed in MMC 501.

3. **BUSY:** This is the number of times each trunk group was busy when someone attempts to access it.

CONTENTS

C******** INDIVIDUAL TRUNKS **********

1TRUNK	2TRUNK-NAME	3ATTA	4ANSD	5NOT-ANSD	6OUTGOING	7BUSY
701		0000	0000	0000	0000	0000
702		0000	0000	0000	0000	0000
703		0000	0000	0000	0000	0000
704		0000	0000	0000	0000	0000
705		0000	0000	0000	0000	0000
706		0000	0000	0000	0000	0000
707		0000	0000	0000	0000	0000
708		0000	0000	0000	0000	0000
709		0000	0000	0000	0000	0000
710		0000	0000	0000	0000	0000

1. **TRUNK:** A listing of each trunk in the system.
2. **TRUNK NAME:** The names of each trunk as programmed in MMC 404.
3. **ATTA:** Average Time To Answer for trunks is counted in the number of seconds that ringing voltage is detected at the trunk interface and the timer stops when trunk is answered by station or device in the system. The ATTA is the sum of all answered times divided by the answered call count.
4. **ANSD:** This is the number of times this specific trunk was answered by any station or device whether it is a new call or a recall.
5. **NOT-ANSD:** This is the number of times this specific trunk rang the system but was not answered. These are the same calls that would be flagged as abandoned in SMDR.
6. **OUTGOING:** This is the number of times this trunk was used to make an outgoing call. A valid outgoing call is defined by the SMDR START TIME programmed in MMC 501.
7. **BUSY:** This is the number of times this trunk was busy when accessed by a button or dial code.

D******** STATION HUNT GROUPS **********

	<———— 1 OUTSIDE CALL ————————>		5 <-INTERCOM->
2GROUP	3ANSD	4NOT-ANSD	6ANSD
500	0000	0000	0000
501	0000	0000	0000
502	0000	0000	0000
503	0000	0000	0000
504	0000	0000	0000

1. **OUTSIDE CALLS:** These statistics are for outside calls that reach these station groups regardless how they arrive there.

CONTENTS

2. **GROUP:** Listing of all station groups in the system.

3. **ANSD:** This column is a peg count of all answered trunk calls that rang to the specific group directory number regardless of how these arrived.

4. **NOT-ANSD:** The number of times any trunk call directed to the specific group number was not answered by any member of the group.

5. **INTERCOM:** An intercom call made from a station or device within the system to the specific group number.

6. **ANSD:** This is a count of how many times an intercom call was answered by any group member of that specific group.

E************************** INDIVIDUAL STATIONS **************************

1 **11**

<——————————— OUTSIDE CALL ——————————><-INTERCOM->

2 **3** **4** **5** **6** **7** **8** **9** **10** **12** **13**

EXT	STATION-NAME	ATTA	ANSD	NOT-ANSD	DIALED	ICM-TRSF	TRK-TRK	PICKUP	ANSD	DIALED
201		0000	0000	0000	0000	0000	0000	0000	0000	0000
202		0000	0000	0000	0000	0000	0000	0000	0000	0000
203		0000	0000	0000	0000	0000	0000	0000	0000	0000
204		0000	0000	0000	0000	0000	0000	0000	0000	0000
205		0000	0000	0000	0000	0000	0000	0000	0000	0000

1. **OUTSIDE CALLS:** These statistics are for outside calls that in any way reach individual stations or devices.

2. **EXT:** Listing of all extension numbers in the system. This also includes AA, VM, and CADENCE ports.

3. **STATION NAME:** The name for each particular station as programmed in MMC 104.

4. **ATTA:** Average Time To Answer for stations is counted in the number of seconds that ringing signal is applied to a station for trunk calls and recalls. The ATTA is the sum of all answered times divided by the answered call count. Use the same calculation method as used for individual trunk ATTA.

5. **ANSD:** This is a count of how many times an outside call was answered by the specific station. Outside callers recalling a station are not counted again when they are answered.

6. **NOT-ANSD:** This is a count of how many times a trunk call was directed to the station but was not answered by this station.

7. **DIALED:** Peg count of how many times the station made a valid outside call. An outside call is defined by the SMDR start time in MMC 501.

CONTENTS

8. **ICM-TRSF:** This is the number of times a trunk call was successfully transfered to another station using the intercom. It includes both screened and unscreened transfer.

9. **TRK–TRK:** This is the number of times a trunk call was transfered to another trunk (tie line) This is called a trunk–to–trunk transfer. This field gets pegged every time the station completes a trunk to trunk transfer.

10. **PICKUP:** This is a count of the outside calls that were picked up by the specific station. Picked-up calls are calls that are not ringing at your station but were answered by you. This peg count is separate from the number of answered call in #5 of Individual Stations section E.

11. **INTERCOM:** Statistics for intercom calls. An intercom call made from a station or a station device within the system to another station.

12. **ANSD:** This is the number of times an intercom call was answered by this specific station. Screened transfers count as an answered intercom call.

13. **DIALED:** The number of times the specific station dialed another station or station group. Screened transfers count as a dialed intercom call.

4.11 SAMPLE ALARM REPORT

CONTENTS

ALARM REPORT FOR [400SI SAMPLE] MAR/24/1999 19:45

MM/DD/YYYY	ERR.TIME	ERR.CODE	ERROR DISPLAY	POSITION
03/14/1999	16:45:00	[MJC03]	CID DSP Fault	MAP OPT:1
03/14/1999	16:45:00	[MJC03]	CID DSP Fault	MAP OPT:2
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S01
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S04
03/14/1999	16:45:00	[MJC03]	CID DSP Fault	MAP OPT:1
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S01
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S04
03/14/1999	16:45:00	[MJC03]	CID DSP Fault	MAP OPT:1
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S01
03/14/1999	16:45:00	[MNF03]	IPC Error	C1-S04
03/14/1999	16:46:00	[MNF01]	Card Out	C1-S10
03/14/1999	16:46:00	[MNF02]	Card In	C1-S10
03/14/1999	16:47:00	[MJD01]	SYNC Failure	C2-S2
03/14/1999	16:47:00	[MJD02]	SYNC Recvry	C2-S2
03/16/1999	16:47:00	[MNF04]	Trunk Fault	C1-S08-P03
03/16/1999	16:48:00	[MNF05]	Trunk Recvry	C1-S08-P01
03/16/1999	16:48:00	[MNF05]	Trunk Recvry	C1-S08-P02
03/16/1999	16:48:00	[MNF05]	Trunk Recvry	C1-S08-P03
03/18/1999	16:51:00	[MNF01]	Card Out	C1-S02
03/18/1999	16:51:00	[MNF02]	Card In	C1-S02
03/18/1999	17:04:00	[MJC04]	Ring Gen Fault	CABINET:1
03/19/1999	17:22:00	[MJC05]	Ring Gen Recvry	CABINET:1
03/19/1999	17:23:00	[MNF01]	Card Out	C1-S06
03/20/1999	17:24:00	[MJC01]	DTMF Fault	CCP OPT:1
03/20/1999	17:24:00	[MJC01]	DTMF Fault	CCP OPT:2
03/20/1999	17:24:00	[MJC01]	DTMF Fault	CCP OPT:3
03/20/1999	17:24:00	[MJC01]	DTMF Fault	CCP OPT:4
03/20/1999	17:24:00	[MNF03]	IPC Error	C1-S01
03/20/1999	17:24:00	[MNF03]	IPC Error	C1-S04
03/24/1999	17:24:00	[MJD19]	PRI Restart	C2-S6
03/24/1999	17:25:00	[MNF16]	PSU Alarm	CABINET:2

CONTENTS

PART 5. GENERAL USER INFORMATION

5.1 RADIO FREQUENCY INTERFERENCE

WARNING: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and operated in accordance with the instruction manual, it may cause interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The following measures can be tried:

1. Reorient the receiving antenna.
2. Relocate the telephone with respect to the receiver.
3. Move the telephone equipment away from the receiver.
4. Plug the Key Service Unit into a different AC outlet so that the KSU and receiver are on different circuits.

5.2 FCC REQUIREMENTS

The DCS 400si electronic telephone system complies with Part 68 of the Federal Communications Commission Rules and Regulations. On the side of the 400si cover and on the inside left hand side of the each cabinet is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for the DCS 400si. If requested, this information must be provided to the telephone company.

UNAUTHORIZED MODIFICATIONS

Any changes or modifications performed on this equipment that are not expressly approved in writing by SAMSUNG TELECOMMUNICATIONS AMERICA could cause noncompliance with the FCC rules and void the user's authority to operate the equipment. NOTE: Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC's rules.

NOTIFICATION TO TELEPHONE COMPANY

Before connecting the DCS 400si system to the telephone network, the telephone company may request the following information:

a. Your telephone number or all numbers that will be connected to the DCS 400si.

b. FCC Registration Numbers:

- Fully Protected Multifunction Systems A3LKOR-25495-MF-E
- Fully Protected PBX's A3KLOR-25260-PF-E
- Fully Protected Key Telephone Systems A3KLOR-25496-KF-E

CONTENTS

c. Ringer Equivalence Number 0.5 B for D8UTK and D16TK
d. Interface Jack type RJ21X

The 400si may be configured as a key system or a hybrid system. Depending on the method of operation, the appropriate FCC number must be given to the telephone company. Certain features such as pooled access by button or dial access, LCR, off premise extensions and tie lines may require the hybrid registration. Check with the local telephone company providing the service if you are in doubt. It is the customer's responsibility to comply with local telephone company tariffs.

TELEPHONE CONNECTION REQUIREMENTS

The Federal Communications Commission (FCC) has established rules which permit the 400si to be connected directly to the telephone network using telephone company network access jacks usually referred to as "Registered Jacks."

5.3 TELEPHONE COMPANY INTERFACES

CIRCUIT TYPE	DCS 400SI CARD TYPE	FACILITY INTERFACE CODE	NETWORK JACK
LOOP START LINE	D8UTK D16TK DTPRI	O2LS2 O2LS2 04DU9-BN	RJ21X RJ21C RJ14C RJ11C RJ48C
GROUND START LINE	DTPRI D8UTK	04DU9-BN 02GS2	RJ48C RJ21X RJ11C RJ14C
DID LINE	T1 D8UTK	04DU9-BN 02RV2-T	RJ48C RJ21X RJ11C RJ14C
E & M TIE LINE	T1 D8UTK	04DU9-BN TL11M	RJ48C RJ2EX
ISDN	D8BRI DTPRI	02IS5 04DU9-C	RJ48C RJ48C
OFF PREMISES EXTENSION	D16SLI circuit board only	OL13C	RJ21X RJ11C RJ14C

CONTENTS

NOTE: See Special Application section for information about ordering ISDN services.

RINGER EQUIVALENCE (REN)

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the number of RENs, contact the telephone company to determine the maximum REN for the calling area.

INCIDENCE OF HARM

If the terminal equipment, the DCS 400si, causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

CHANGES TO TELEPHONE COMPANY EQUIPMENT OR FACILITIES

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications so that you may maintain uninterrupted service.

SERVICE CENTER

If trouble is experienced with the DCS 400si, please contact your SAMSUNG TELECOMMUNICATIONS AMERICA at (305) 592-2900 for repair or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

FIELD REPAIRS

Only technicians certified on the DCS 400si are authorized by SAMSUNG TELECOMMUNICATIONS AMERICA to perform system repairs. Certified technicians may replace modular parts of a system to repair or diagnose trouble. Defective modular parts can be returned to SAMSUNG TELECOMMUNICATIONS AMERICA for repair.

GENERAL

This equipment must not be used on coin telephone lines. Connection to party line service is subject to state tariffs.

The DCS 400si system uses toll restriction and LCR features that are programmed to allow dialing over the public telephone network. The North American Numbering Plan (NANP) determines these network area codes and exchange codes. Failure to update the system programming or software may deny you access to new area codes and exchanges. Bell Communication Research (Bellcore) administers the NANP and publishes it. To obtain the latest information and keep your system current, contact Bellcore at (201) 829-3071.

CONTENTS

HEARING AID COMPATIBILITY

All models of the keysets are hearing aid compatible as specified in Part 68 of the FCC Rules.

5.4 UNDERWRITERS LABORATORIES

The 400si system has been tested to comply with safety standards in the United States as listed below. This system is listed with Underwriters Laboratories.

LISTED **US**
UL 83X3
E118093
Project No.: 98NK12211

5.5 MUSIC ON HOLD WARNING

IMPORTANT NOTICE: In accordance with US copyright laws, a license may be required from the American Society of Composers, Authors and Publishers (ASCAP) or other similar organizations if copyrighted music is transmitted through the Music on Hold feature. SAMSUNG TELECOMMUNICATIONS AMERICA hereby disclaims any liability arising out of failure to obtain such a license.

5.6 EQUAL ACCESS REQUIREMENTS

The 400si is capable of providing users access to interstate providers of operator services through the use of access codes. Modifications of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumer Act of 1990 and Part 68 of the FCC Rules.

5.7 DISA WARNING

Lines that are used for the Direct Inward System Access feature must have the disconnect supervision options provided by the telephone company.

WARNING: As it is impossible to control who may access your DISA line it is suggested that you do not turn this feature on unless you intend to use it. If you do use this feature, it is good practice to frequently change passcodes and periodically review your telephone records for unauthorized use.